Telephony.

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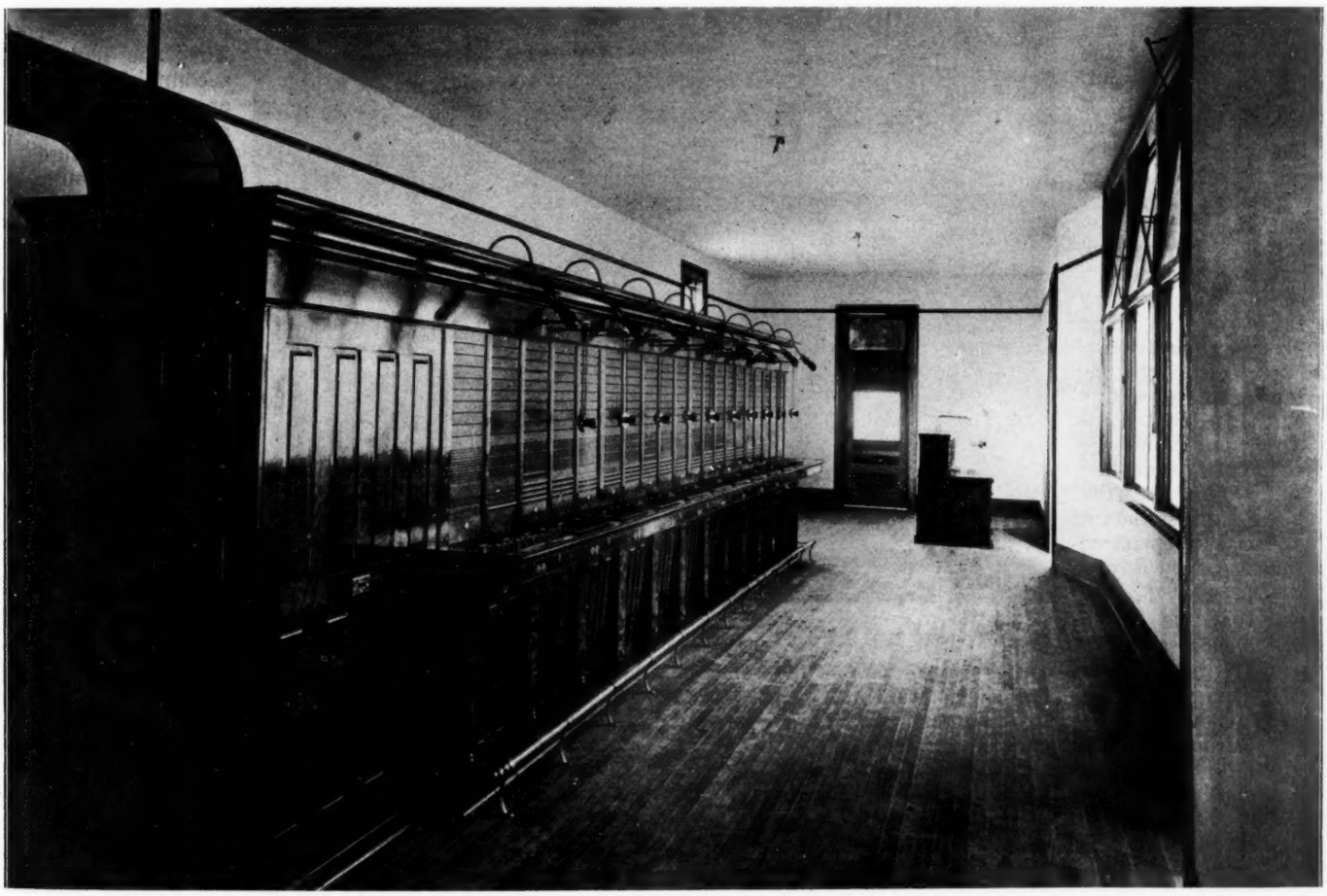
Independent Telephony in Wisconsin

EARL C. LONG

WERE the unwritten history of the Independent telephone movement in Wisconsin to be recorded, no single element or factor would probably have been so largely represented in its advancement and progress as the firm of Jones & Winter, telephone engineers and contractors, formerly of St. Paul, Minn., from whence, as early as 1895, they installed in the city of Rochester, Minn., one of the first few pioneer telephone exchanges in the history of the Independent movement, following that with various other exchanges in that state, in Iowa, in South Dakota, and in Wisconsin, where early in 1898, they completed their first Wisconsin exchange at Marshfield, following this with exchanges at Janesville, Beloit, Mineral Point, Evansville, Brodhead, Monroe, Edgerton, Antigo, Racine, Milton and Milton Junction, Clinton, and Sharon, which said Wisconsin exchanges alone have now an aggregate of more than 8,000 telephones in successful operation.

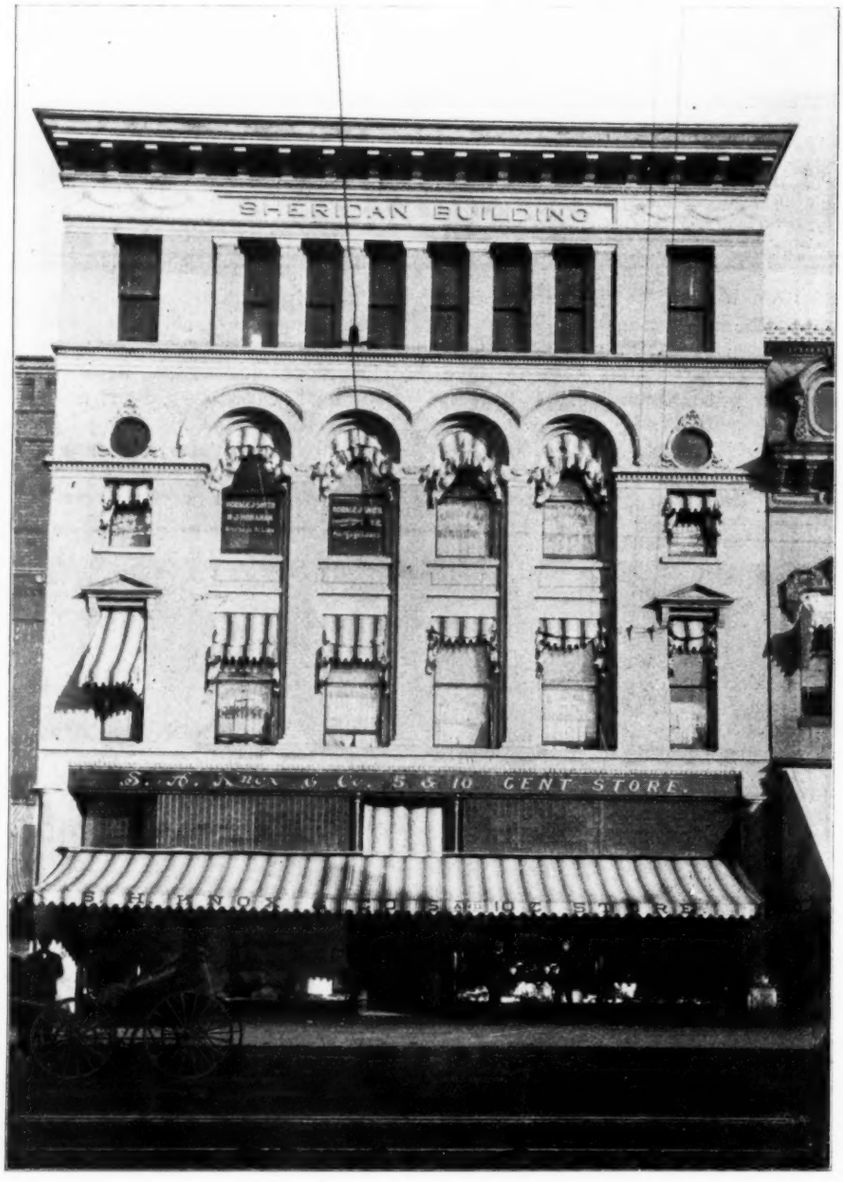
In the early summer of 1900 the firm changed their base of operations to Chicago, taking offices at 1259 Monadnock



MAIN SWITCHBOARD, FOX RIVER VALLEY TELEPHONE AND TELEGRAPH COMPANY.

block, which they have since occupied. At the present moment, this firm is just completing its fifteenth and sixteenth Wisconsin exchanges, at Green Bay and De Pere respectively; the former with an initial setting of 1,000 telephones, and the latter of 300 telephones, and concerning which the following data will unquestionably interest many readers of TELEPHONY:

In the autumn of 1902, certain gentlemen of the middle West made application to the city authorities of Green Bay for a franchise authorizing an Independent telephone system in that city. As usual, this action was the signal for aggressive work on the part of the Bell company. Throughout the whole state of Wisconsin, the Fox River Valley alone remained to the Bell company as a practically uninvaded monopoly up to 1902, for previously their business had been materially trespassed upon and cut into by Independent local ownership in almost every other portion of the state. No Independent success had been attained however, at any point in the rich and prolific field afforded by the various cities and country sides of the Fox River Valley until 1902, when Mr. J. S. Van Nortwick and associates, of Appleton, practically in self-defense for that city, under conditions entirely unbearable longer, took the matter in hand and installed an exchange of 450 subscribers, thus effecting the entrance of a wedge which the Bell company were in nowise inclined to see pushed any further by the successful installation of an Independent plant at Green Bay.



EXCHANGE BUILDING, FOX RIVER VALLEY TELEPHONE & TELEGRAPH CO.

It is local history now that they were quite successful in the deferment of any proper consideration, favorable or otherwise, to the applicants of this franchise, even when in December of that year the same parties with associates applied to the state and secured a charter authorizing the incorporation of the Valley Telephone and Telegraph Company, with a proposed capitalization of $200,000. Thus matters stood with a franchise applied for, a company organized and the Wisconsin Bell so fully in control of the field as to delay any consideration whatsoever until August, 1903, when the entire proposition was turned over to Jones & Winter, who then undertook the accomplishment of the seemingly impossible.

It is, perhaps, not too much to say for this firm that, never having known defeat in their varied and many past encounters with this same common enemy, they at once marshaled their forces for victory, and although the fight was a severe one, and one of the most memorable and widely known in the progress of Independent telephony, either in Wisconsin or any of the middle Western states, they came through with flying colors, in September of 1904 being granted a full and complete franchise by the city council of Green Bay, among the citizens of which beautiful little city they had also in the interim, by their straightforwardness and honorable dealing, created a sentiment of confidence and support, which has since shown itself in many forcible and favorable ways.

During the year of the struggle they had acquired the former charter of the Valley Telephone and Telegraph Company, increased the capital stock to $250,000.00 and immediately upon the granting of the franchise made rapid preparation for the erection and construction of one of the finest and best equipped telephone exchange properties in the entire West. This has now been accomplished, together with the coincident installation of the second exchange at De Pere, six miles up the river, both of which cities are connected by ample trunk lines for thorough connection.

That the long suffering public of both cities are not unappreciative of the new successful issue of this somewhat lengthy struggle is indicated by the fact that, within the next thirty days, practically everyone of the thirteen hundred telephones contemplated as an original installation will have been placed in paid service, hurry orders for the new telephones, on the part of those who are throwing out Bell instruments right and left, being voluntarily offered in number greater than even the large force now employed can handle for some weeks to come.

As will be seen by reference to the illustration, the building which affords a home for the Green Bay exchange is one of the best, largest and most imposing business structures in the city. Central office occupies the entire fourth floor, about 50x125 feet, of the new and modern Sheridan office building, and is conveniently arranged for the location and operation of the various apparatus. The switchboard

room is 54x16 feet, well ventilated and lighted. The terminal room is 14x28, and the machine room 12x14. The storage batteries are located in an interior room, the fumes being carried off through wooden flues. Work and storage rooms are of ample size. A rest room for the operators is provided, and neatly furnished, and will be kept supplied with reading matter. The manager's office is a commodious room adjacent to the elevator and is supplied with furniture necessary to a business office. All rooms are piped for gas, and wired for electric light, and are heated by steam.

The switchboard is of the well-known Sterling make. It consists of four sections of five panel multiple, of three operators' positions each, and a cable turning section. Each section has an ultimate capacity of 5,000 multiple jacks and 125 multiple trunk jacks, with present equipment of 1,500 multiples and twenty-five trunks jacks, and 1,500 answering jacks.

Fifteen cord circuits are placed in each position, each cord being provided with a supervisory lamp, this lamp being controlled by the subscriber who is connected with the jack in which the plug is inserted. There are no relays in the cord circuit. A pilot lamp is provided for each position; a night alarm is also so arranged as to be switched in circuit when desired. The lamp signals are mounted just above the answering jacks, and fitted with numbered opals. Each cord circuit is provided with individual designating keys of the latest improved design, and arranged for four party selective ringing.

The framework of the switchboard is of structural angle iron, constructed and braced so as to be strong, rigid, and covered with quarter sawed selected oak. The finish is a rich golden oak. The rear of the board is fitted with removable doors, giving ready access to all parts.

The main distributing frame is of angle and channel iron, mounted with terminal clips for 2,200 pairs of cable and 1,500 heat coil and carbon protectors. An intermediate distributing frame is also provided.

The relays, of which there are two in each line, are mounted on steel strips on a rigid iron frame, each relay being enclosed in a dust proof case which is readily accessible and removable from the strip. The cable from frame to frame, and to switchboard, is neatly done through overhead runways of iron lattice work.

The power plant consists of two sets of storage battery of eleven lead lined cells each, the cells themselves being sufficiently large to take elements ample for the ultimate capacity of the exchange for twenty-four hours. The charging machine is of the Holtzer-Cabot manufacture, the motor and generator being directly connected by an insulated shaft coupling. Two direct connected ringing machines are furnished, one being driven by purchased current, the other operating from the storage battery. Power board and starting panel are of enameled slate, supported on heavy angle iron frames. On the power board are mounted suitable apparatus for indicating the voltage and current output of the batteries and charging machines, the necessary switches, circuit breakers and fuses. All fuses throughout the installation are of the enclosed type. The starting panel is provided with rheostats, switches and fuses controlling the operation of the machines.

There is provided a combined chief operator's and toll desk of same finish as main switchboard. The chief operator's position is provided with circuits to each operator's position on the main board and also has duplicate pilot lamps operating in unison with the lights on main board. A talking circuit is also provided from this board to the wire chief's desk. The toll position has capacity for thirty toll lines. There are ten complete cord circuits adapted for use between toll connections and between toll and local connections. A wire chief's desk is installed in the terminal room. It is equipped with a special testing voltmeter, and all circuits are so arranged that any test required may be made on the system. It has five trunk lines from the main switchboard, five testing trunks to the main distributing board, a two-way talking circuit to the chief operator's desk, also a special testing trunk to the third position of the main board.

In both Green Bay and De Pere the service is supplied by a very complete and comprehensive system for cable distribution. In both cities, too, this distribution is largely accomplished through an ample and exhaustive system of underground conduits especially placed for this work, the underground system for Green Bay consisting of about 74,500 lineal feet of the best fibre conduit, all laid in cement concrete and distributed through 19,500 feet of trenching. Embraced within this system are thirty-five manholes conveniently located for distribution. The underground system in De Pere consists of nearly 9,000 lineal feet of the same conduit, laid in about one mile of trenching, with nine manholes for distribution.

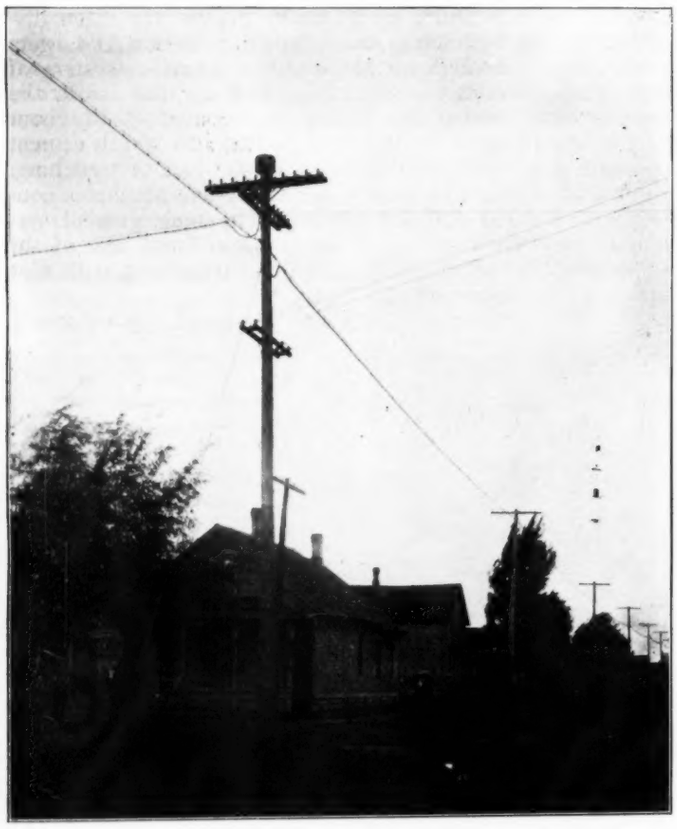
In cable distribution there are employed approximately

VIEW SHOWING AERIAL CONSTRUCTION.

112,000 lineal feet of the best double wrapped, dry paper insulated, lead encased cable, 40,000 feet of which is employed in the underground conduit systems, ranging in size from 350 pair—which is largely employed—down to feeder lengths of 100 and even 50 pair in some cases. In the underground district no poles are used, excepting a distributing pole in each block, from which the distribution is made through approved pole terminals. In Green Bay there are 113 of these and in De Pere thirty-nine. These pole terminals are of the S. M. and M 2 type, manufactured by Frank B. Cook, Chicago. The remaining 72,000 feet of cable, used in aerial distribution, ranges in size from 25 to 150 pair, mostly running, however, in 50 pair, 75 pair and 100 pair units. Accompanying illustrations show some of this aerial cable; a few of the pole cable terminals, examples of the terminal arming and the general pole line construction. The layman in telephone work who will examine these views will need no prompting by which to institute comparisons between the present street equipment and pole lines of the Wisconsin Bell company (some of which are also unavoid-

ably shown in one or two of the cuts), and that installed for the new company by Jones & Winter.

Notwithstanding the liberal cable scheme outlined, there are still necessary, by reason of the extent of this work, about 2,100 poles, a large number of which were brought



VIEW SHOWING AERIAL CONSTRUCTION.

from Idaho, because of the well known beauty and erectness of that stock. The pole lines comprise about forty-seven miles and, owing to the stock employed and the methods pursued in this work, present an appearance very attractive from the standpoint of good construction. The cable employed throughout was supplied by the Standard Underground Cable Company, of Pittsburg, having been sold direct to Jones & Winter through the company's Chicago office, presided over by the genial Mr. J. R. Wiley.

There are brought into the central office cable terminals at Green Bay cables having a capacity of 2,125 pairs, and at De Pere 475 pairs. From the central office manhole at Green Bay there is a capacity of twenty-two ducts and from the central office manhole at De Pere a capacity of eight ducts. It will thus be seen that, to provide for future growth, by using cable units which will average 300 pair, the duct capacity at Green Bay provides for a possibility of over 6,000 telephones, each telephone on its own, individual metallic circuit, while at De Pere by the same reckoning over 2,000 telephones may ultimately be installed.

Among the several engineering difficulties to be overcome was that of submarine cables, both at Green Bay and De Pere, connecting the two portions of each city under water. This was accomplished at Green Bay by the employment of seven submarine cables having an aggregate capacity of 750 pairs, armored with No. 6 galvanized iron wire, and laid from shore to shore, twenty-six feet deep. The work was accomplished by divers, who placed the cables thus from four to six feet below the river bed. At De Pere one cable having a capacity of 150 pairs was similarly placed. Each submarine cable was brought into convenient manholes on either side of the river and there connected into the respective cable systems.

In the early summer, during the progress of the work at Green Bay and De Pere, in casting about for future connections, Messrs. Jones & Winter and their associates in the Valley company opened negotiations with Mr. J. S. Van Nortwick and associates of the Fox River Valley company of Appleton, looking to the effectuation of the absolute premanency and stability of local Independent interests through the purchase of the Appleton property by the Valley company, or its consolidation therewith. Early in September this greatly-to-be-desired event was accomplished by the reorganization and enlargement of the Valley company, its capital stock being increased to $350,000.00, and the name changed to The Fox River Valley Telephone and Telegraph Company.

The new organization enrolls among its stockholders some of the most prominent business men of Chicago, Appleton, Green Bay and Marinette. Its directors are named as follows: Chas. F. Spalding and W. F. Hays, of Chicago; J. S. Vant Nortwick, John M. Baer, D. E. Reese and J. McNaughton, of Appleton; Dr. W. E. Fairfield and L. C. Schilling, of Green Bay, and W. J. Davis, of Marinette. Of the gentlemen named, J. S. Van Nortwick is president, Dr. W. E. Fairfield vice-president, W. F. Hayes treasurer and Jos. P. Hoeffel, of Green Bay, secretary.

In the consolidation of the Appleton and Green Bay propositions the gentlemen interested have covered the future of the Independent telephone movement over that portion of Wisconsin with an absolute insurance of guaranteed results. As now operating the company is one of the strongest, if not the strongest, single Independent organization in the state, and the personnel of the directors alone is sufficient warrant for its future aggressiveness in the field of extensions and toll connections. In fact, the Appleton exchange

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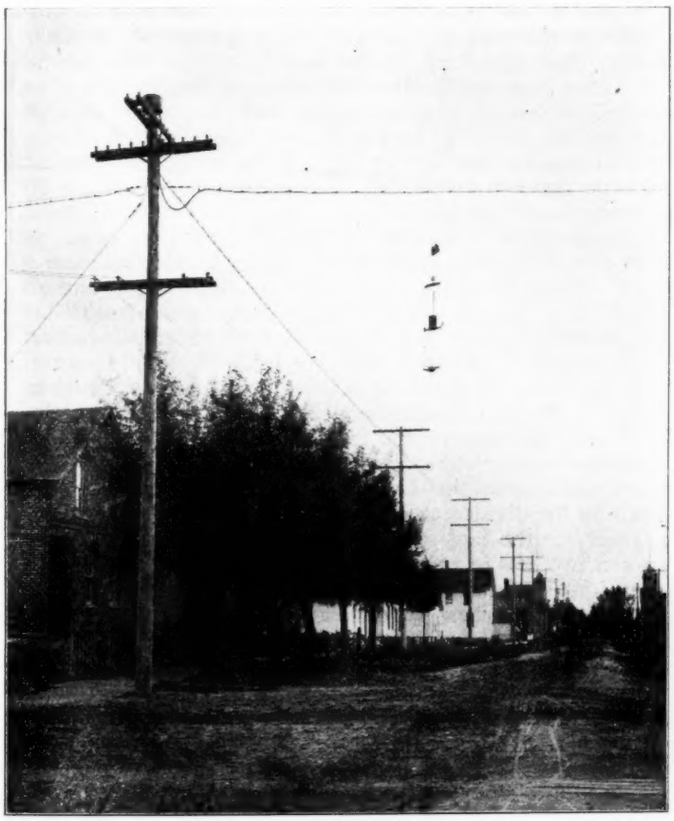
already has about fifty miles of toll line, connecting Kaukauna, Little Chute, Kimberly, Greenville, Hortonville, Medina, Dale, Readfield, Freemont, and Weyauwega. At Weyauwega connections are had with the Interurban company, and through that company to the Standard Telephone company, giving connections to towns in Outagamie, Waupaca, Portage and Waushara Counties.

The company has already under contract for immediate construction a through trunk toll line from Kaukauna to Green Bay, through Wrightstown, Greenleaf and De Pere and which will be in operation within thirty days. Ample lines will also be built, radiating from Green Bay, to the surrounding towns and settlements, to care for and bring in all toll and farm business tributary.

Since the opening of the Appleton exchange in 1902, this property has grown and prospered under the skillful management of Capt. John M. Baer, until it now numbers over eleven hundred subscribers. The system is modern in construction, full underground cable distribution throughout the business district, beyond which aerial cables and wire supply the more remote portions of the city. Distribution is effected through approved pole cable terminals. The pole lines covering the city are particularly well built of heavy Wisconsin and Idaho poles, varying from forty to sixty feet in length. The equipment is of a well known multiple, flash-light system having an ultimate capacity for 3,000 tele-



VIEW SHOWING AERIAL CONSTRUCTION.

phones. Charging and ringing machines are of the Holtzer-Cabot make. Cable capacity coming into central office is for 2,050 pair.

That the Fox River Valley Telephone and Telegraph Company, of Green Bay and Appleton, thus so auspiciously launched, will be a welcome and important addition to the ranks of the Wisconsin Independents is a foregone conclusion. That no element making for immediate and permanent success has been overlooked in its habilitation is equally apparent. Finally, to the thorough, efficient and far-reaching organization of the Jones & Winter forces and to the able lieutenants in their employ—Mr. Chas. E. Wise, who heads the list in this instance having had personal charge of much of the detail work—is due a tribute of gratitude for saving the rich Fox River Valley to the Independent cause, and for constructing for the people of the Fox River Valley a telephone system as good as can be found anywhere in the country.

ORGANIZATION OF IOWA CLEARING HOUSE COMPLETED.

The final arrangements for the organization of the Iowa Independent Telephone Clearing House were completed at a meeting of representatives of companies throughout the state held recently at Boone.

The purpose of this new organization is to check the toll messages and apportion the amount of the total earnings which pass over two or more toll lines. The association will have the same powers over the toll business of the companies interested as the Western Passenger Association has over the mileage of the Western railroads. The headquarters of the association will be in Des Moines, it being centrally located and easily reached by the members and officers.

Meetings will be held at the call of the president, C. C. Deering, and a number will in all probability be held in the near future or until the company has been given a good start.

The officers of the company follow: President, C. C. Deering, Boone; vice-president, P. C. Holdoegel, Rockwell City; secretary and treasurer, J. M. Plaister, Fort Dodge. The three officers mentioned above, together with E. H. Martin, of Webster City, and Charles E. Cockerill, of Sioux City, will constitute the board of directors.

Among those who attended the meeting were the following: W. G. Bowe, Marshalltown; E. H. Martin, Webster City; U. S. Alderman, Nevada; F. M. Boardman, Nevada; C. A. Peterson, Manchester; S. S. Lichty, Waterloo; W. J. Phill, Dyersville; Charles G. Cockerill, Sioux City; H. A. Douglass, Cedar Rapids; J. F. Glenn, Denison; H. A. Kinney, Woodbine; M. A. Reed, Woodbine; P. C. Holdoegel, Rockville City; J. M. Plaister, Fort Dodge; J. C. Thorne, Fairfield; Dr. Nelson, Dayton; Charles C. Deering, Boone.

CANADIAN INDEPENDENT TELEPHONE ASSOCIATION.

Independent telephone companies representing Ontario, Quebec and New Brunswick met in convention in Toronto on September 6, and formed the Canadian Independent Telephone Association. Resolutions were adopted declaring in favor of government ownership of all trunk lines, to which all companies should have access, and protesting against exclusive rights to put telephones in railway stations granted to any one company. A constitution was adopted, setting forth the name of the organization as above.

Mr. B. G. Hubbell, of Buffalo, addressed the convention. He referred to the growth of the Independent companies in the United States, where, he stated, there are now almost 7,000 Independent companies, with a capital of $200,000,000. Barely twenty-two of these concerns had failed to perform their contracts.

The election of officers resulted as follows: President, A. Hoover, Green River; vice-president, F. D. MacKay, Peterboro; secretary and treasurer, B. F. Wilson, Markham.

MISSOURI ASSOCIATION ELECTS TRAVELING SECRETARY.

At the meeting of the executive committee of the Missouri Independent Telephone Association, held August 22, 1905, J. F. Bennett was made the acting traveling secretary for the state association. The committee divided the state into nine districts, and Mr. Bennett will complete the district organizations. He has held a meeting at Chillicothe, Missouri, and more will follow.

Concerning Telephone Traffic

SAMUEL G. McMEEN

While probably every example of such practice has passed out of existence, multiple telephone switchboards prior to the early nineties were all arranged for single wire, or grounded, lines, and, at least in some minor particulars, such a type presented advantages of operation not wholly assured by later switchboard practice, because of the higher complication required to handle twice as many line conductors per circuit.

The earliest form of multiple switchboards for grounded lines, in which the general arrangement of line circuits and busy test was substantially the same as the present arrangement, utilized cord circuit of the present two-plug type, and placed the test upon the line merely by crossing the normally inert sleeve circuit with the line circuit carried on the jack springs. In no important particular did the operations involved in the use of these boards differ from those of the two-cord three-wire magneto multiple boards produced in the years immediately preceding the advent of the common battery system. In the hope, however, of accomplishing a higher speed, with a quicker service to the subscribers and a lower cost to the operating company, several types of single wire switchboards were designed, in which pairs of cords were not provided for connecting purposes, but in which each subscriber's line, after passing through its series of multiple jacks, terminated in a single cord and plug belonging particularly to it. In some instances these plugs were kept normally inserted in special jacks of the familiar type, being taken from them upon the call of a subscriber for connection. In others the cord itself passed through a switch or jack mounted in the plug shelf, and in this jack the plug rested rear end first, standing ready to be picked up to answer a call. On a signal for connection from the subscriber, the mere lifting of the plug from its seat enabled the operator to speak to the calling subscriber, and immediately thereafter to test the called line, to connect with it, to ring by the pressure of a key, and promptly to leave that connection to repeat the same process for another.

As is usual in cases of competitive trial between similar things, two-cord and one-cord multiple switchboards had their respective advocates. So far as conclusive evidence remains, it is probable that no exact comparison ever was accomplished, proving or disproving that the one-cord board is a speedier type than any two-cord board otherwise similar; but it is certain that in the use of the one-cord type some records were made which were of a high order, even in comparison with the accomplishments which are possible with the speedier automatic signal type of the present time.

But for the advent of metallic circuits and the complication introduced by doubling the complexity of much of the wiring, it is very evident that the one-cord advocates would have prevailed, at least to the extent necessary to reach a reasonable definite conclusion as to the generally preferable type; but, due to this change from single to double conductor lines, accompanied by a variety of minor reasons, the one-cord board passed out of existence after having given successful and satisfactory service in large and principal offices in Cleveland, Columbus and Cincinnati, Ohio; Portland, Oregon; Chicago and elsewhere. Perhaps the only bit of final information remaining to use is that there is a distinct gain in speed if an operator be obliged to handle but one cord per connection.

In ordinary operations upon a two-cord two-wire magneto multiple board, a total of 1,000 completed connections per position per day may be taken as a reasonably safe average possible to be accomplished without undue driving or extraordinary selection of operators. By virtue of the greater simplicity and directness of answering a call indicated by a lamp immediately adjacent to the answering jack, as well as by virtue of the time saving given by double supervisory signals, this ability is much increased in operators working upon a common battery multiple switchboard having those facilities. It is wholly reasonable to expect that the performance per position per day in such circumstances shall be 1,700 completed connections.

It will be remembered that in the period immediately preceding the production of the present type of equipment for large offices, many more or less conclusive trials of automatic signal equipments were made, notable among which was the express type as used so extensively in California. This equipment involved no multiple of subscribers' lines, being designed particularly to avoid that feature. As operated in California, its results were favorable and in some degree startling, because, even foregoing the advantages of a subscriber's multiple, and by using two sets of operators having distinctly different duties, a very high efficiency was accomplished.

Because of the distinctly favorable impression made by the express system as designed by Messrs. Sabin & Hampton, further improvements were made in Chicago and in Philadelphia. In the former instance the general principle of the California ideas was reproduced, and the co-operation of Mr. Angus S. Hibbard with Mr. Sabin resulted in proving a few more propositions relative to automatic signals in divided method of operation, with certain interesting relative items of current supply from a central point.

Out of the diversity of opinion resulting from all of these experiments came the conclusion that the excellence displayed by the divided automatic type of switchboard lay not so largely in the fact of dividing the work of a connection between two sets of operators, as in the advantages of automatic signals. In due season, therefore, the conclusion was reached that the best type of automatic signal operation, applied to the best type of already existing multiple switchboard, would give the best type of central office equipment. The result was the installation of such an outfit in an office in Worcester, Mass., followed by another with slightly different circuits in Louisville, Kentucky. The latter installation was made in 1897, since which time there has been no notable improvement in the general plan of switching telephone lines by hand.

In the development of exchanges involving several central offices, each to be equipped with common battery multiple switchboards, a high efficiency has been reached by operators who make the connections of incoming trunks with the lines of the local offices. These "B" operators at such trunk positions each will do in a day very many more completed connections than will an "A" operator who answers subscribers. The reason for the greater efficiency of the B operator naturally lies partly in the character of the work as it comes to her, and partly in the highly automatic equipment which she uses.

If one thinks about it a little, the selected and condensed history involved in the foregoing will make it easy to see how natural was a phase of design suggested just prior to the Worcester installation. Briefly stated, this proposition contemplated taking from the A operators all necessity of plugging into answering jacks in response to line signals; and of placing this duty on a special group of operators who would have nothing else to do. Such an equipment may be described in the following terms:

The office to contain a common battery multiple board equipped with A positions having single cord trunks instead of pairs of cords. These trunks, constituting for the A operators their only connecting means, to be equipped with automatic ringing keys, and with necessary lamp signals. Another switchboard in the same or another room to be equipped with no multiple but with answering jacks and adjacent line lamps. The operators working upon these answering jacks to be provided with no telephone receivers or transmitters, and to have as their sole duty to place the plug ends of trunks in the answering jacks in response to the lightning of the line lamps, and to take such plugs out again in response to the re-lighting of the line lamps.

With such an arrangement of things, a subscriber's call would be made in a manner now usual, by lifting the receiver from the hook, lighting his lamp on the special line lamp board. In the original discussions and designs, this was known as the "Y" board, and the operators without telephones working upon it were known as Y operators. One of these, inserting a trunk plug in the jack of the calling subscriber, extinguishes his lamp and passes on to do the same for other calls. The trunk which first picked up the line terminates in the position of some A operator before the multiple. At the instant the Y operator extended the line over this trunk, a signal at its A end called for an answer, this answer being given by the A operator, using a listening key or other even more automatic means, such as lifting the plug. Learning from the calling subscriber what line he desires, the A operator may test, and, plugging in, start an intermittent ringing of the called subscriber's bell, only to be stopped by his answering or the taking down of the connection when it is found that he will not.

It will be seen that such an arrangement would combine such advantages as:

Automatic signals.

Common battery transmission.

Immediate access to the called line in a multiple.

In the "A Y" office, it is reasonable to assume in the light of performances which have been recorded, that the A operators, because of their equipment and the way the work is brought to them, can complete 2,200 calls per position per day, while working at the same mental and physical pitch as the straight A operators in the compared case. If this is so, the number of such A positions required for the 60,000 calls will be twenty-eight.

To bring this work to the A operators, Y operators with no telephones, requiring merely to insert plugs to extinguish lamps, and take them out again for the same reason, may be expected with reason to make at least 7,500 completed operations per day. The 60,000 calls, therefore, will require eight Y operators, making the total of A and Y positions to be filled, thirty-six, exactly the same as the total number of A operators in the compared instance.

But the equipment for the Y operators, so far as the jacks and line signals are concerned, is a practical counterpart of the apparatus which has been eliminated from the A board. The number of plugs and cords in the office is about the same, although differently arranged. The number of multiple jacks displayed before the twenty-eight A positions is approximately 50,000, contained in ten sections. The investment in framework per position is roughly equal in the two plans. The saving, therefore, may be said to be 13,400 multiple jacks, and the cabling belonging thereto.

Single cords to be handled by the A operator.

Absence of manual ringing.

The most natural response to such a proposition is that any gain due to taking from A operators the duty of plugging into answering jacks is offset by the expense of providing a special switchboard and special operators to do this instead. The answer is that while it is true that the A operator, so far as wages alone are concerned, probably can answer her own line signals more cheaply than another can do it for her, the A operator costs more than mere salary because she occupies about two lineal feet of the length of a highly organized and very expensive machine.

Perhaps the best way of reaching even a general idea of the possible saving is the consideration of a concrete case of telephone switching, applying it to first the one and then the other method to see what the results may be:

Let us assume an exchange of a single office; that there are 5,000 lines; that each originates twelve calls per day, and that the equipments to be compared are the standard multiple board of the present type, as against an equipment involving a Y and an A switchboard of the general lines which I have described.

With the standard multiple board, A operators working at a rate of 1,700 connections per position per day will require thirty-six positions to handle the resultant 60,000 calls. The necessary multiple switchboard for them would consist of thirteen three-position sections, containing about 63,400 multiple jacks.

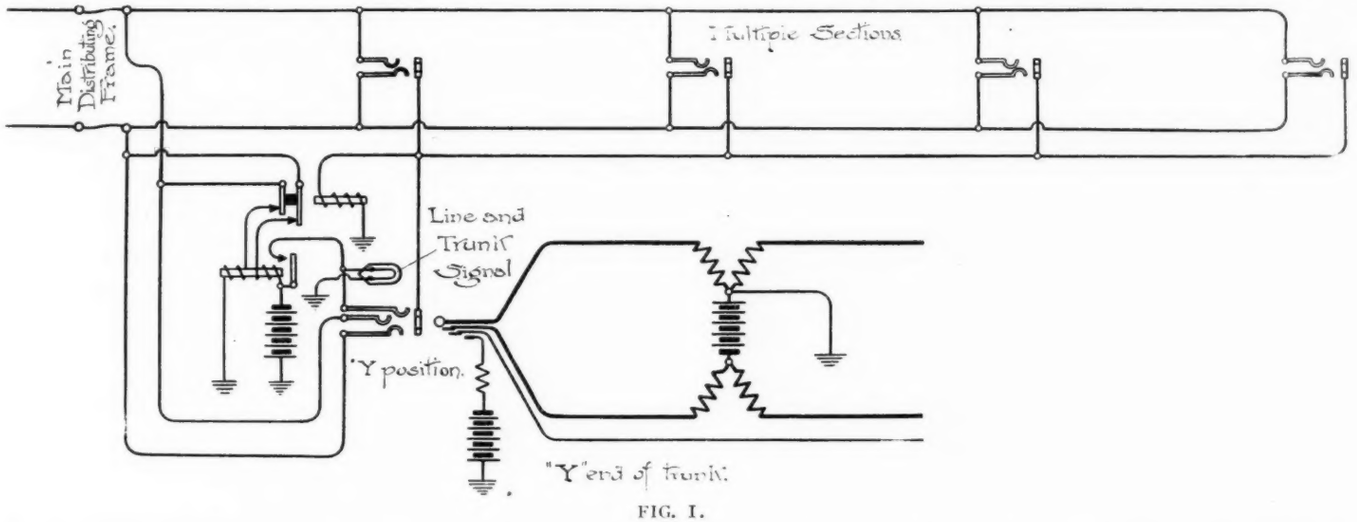


FIG. I.

The cost of the multiple apparatus thus saved by the use of the A Y plan naturally will vary with the circuits involved, but may be taken, for the purpose of our general comparison, at fifty cents per jack cabled. The saving in dollars, therefore, would be $6,700 in favor of the A Y plan.

Such a switchboard as this never has been operated, for the reason that its proposition came at a time when the combination of automatic signals, common battery transmission, and a multiple board, was in process of being applied for actual test in practice. Naturally the A Y combination depended on the proof of success of many of the experimental

elements involved in the common battery multiple trial. The success of the latter was great enough to cause a quite general adoption of that method, and as has been expressed quite aptly by a prominent engineer, the A Y or call distributing plan was required, by the exigencies of practice and the inertia of management, to await the coming of the time when telephone operating companies would begin to seek the next refinement in economy of performance.

Nevertheless the expriment came so nearly being tried that a large switchboard on this plan was partly constructed, when its completion and trial were abandoned because of the imminent beginning of service with the board prepared for Worcester.

It is probable that the day is near when the next refinement in economy of central office operation will be welcomed, and it is also probable that if not the next, at least an early refinement will be one having call placing or call distributing as its basis.

In order that a practical conception of about how things would happen under the A Y arrangement may be gained, some examples of circuits are shown herein. These are not the circuits which were proposed for the equipment which nearly went in service, but contain their general elements, and are in harmony with one of the types of common battery multiple equipment which has been tried by extensive service.

Fig. 1 illustrates the line circuit through the multiple sections and to the Y position at which it terminates, and includes also a part of a trunk leading from the Y board to the A board. This trunk is shown in greater detail in Fig. 2. In Fig. 1 it will be seen that the line is equipped with a cut-off relay and with a line relay controlling a signal lamp associated with the answering jack. This signal lamp, however, is so connected that one of its terminals appears in the answering jack as well as in the line relay contact, so that with such a trunk plug as is used for answering purposes, the circuit of the lamp may be carried over the trunk to an A position. This enables the line signal to serve also as a trunk disconnect signal, when the A operator, finding the conversation completed, shall disconnect her end of the trunk from the called line.

The details of this and the other features may be seen by reference to Fig. 2, in which will be noted the presence of the repeating coil for supplying current to both the calling and the called subscriber. The operator's listening key, K, enables the A operator's set to be bridged across the circuit. It will easily be seen that this bridging might be controlled by the mere lifting of the trunk plug. As the key is arranged, the operation of listening breaks an extra contact, which extinguishes the line lamp on the Y board as an operation presumably immediately consequent upon the insertion of the answering plug. At the same time the lamp L will be extinguished, as its purpose of notifying the A operator that a call has been placed is now accomplished. As soon as the A operator places the plug of the chosen trunk in the called line, after testing, the disconnect lamp L^2 will be lighted, and as the current for lighting it flows through the relay R, the lamp L and the line signal lamp of K is released when the connection is completed.

Fig. 2 contains no details of the ringing key or automatic ringing mechanism which may be associated with Fig. 1 will be kept extinguished even when the listening key the A end of the trunk. If a mere manual ringing key is used, it will be inserted in the familiar manner at the points indicated in the drawing. If the ringing is to be automatic, such an arrangement as is shown and described below with reference to Fig. 3 will satisfy the requirements.

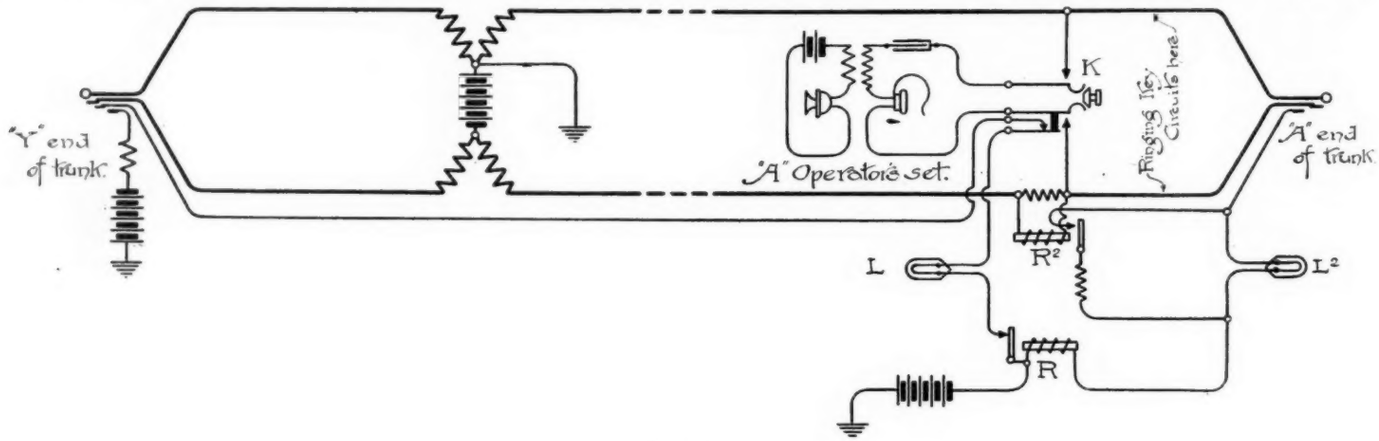


FIG. 2.

However the subscriber may be rung, upon his response the relay R^2 will operate to shunt out the lamp L^2, both in Fig. 2, which will remain dark until the completion of the conversation, and the hanging up of the receiver of the called subscriber. When this occurs and the calling plug is removed, the relay R falling away will relight the line lamp at the Y board, causing that operator to disconnect her end of the trunk.

If automatic ringing is to be accomplished, the arrangement shown in Fig. 3 will enable all manual ringing keys to be omitted, and the calling of the required subscriber to begin upon the insertion of the calling plug. In that event

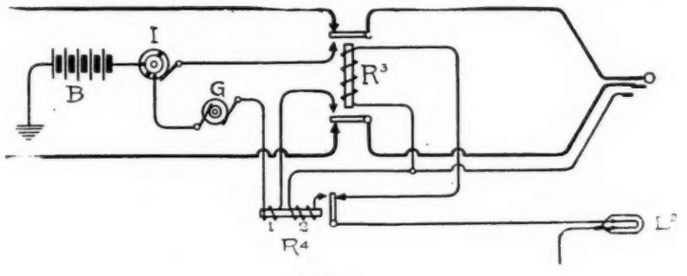


FIG. 3.

the signal lamy L^2 will be lighted upon the insertion of the plug, but the current which lights it will flow also through the relay R^3. This relay, being little else than an electromagnetic ringing key, will place interrupted ringing current from the generator G directly upon the line. As the interrupted or intermittent character of the ringing current rings the bell in periods of ringing and of silence, the silent periods, through the agency of the interrupter I, are those during which current from the battery B is placed upon the line instead of the alternating current of the generator. Upon the removal of the receiver from the hook at the called station, whether during the period of ringing or the period of battery current, there will be a sufficient increase in current through winding 1 of the relay R^4 to operate that

relay, extinguishing the signal lamp and releasing R^3. Conditions are now satisfactory for conversation, which may ensue, with the succeeding disconnect performances, as already have been described.

The circuits shown and described are intended merely to be indicative of the plan, and as of assistance in seeing how such an arrangement may take form. It is fully realized that they do not fulfill all of the requirements, but it is hoped that what has been said will enable a conception to be gained.

The operation of selectors in the familiar Strowger automatic type of central office equipment has familiarized observers with automatic means of selecting idle trunks. This familiarity has taken away much of the formerly existing horror of delicate moving parts associated with circuits, and has resulted in much speculative discussion concerning the applicability of such selecting switches to systems otherwise largely manual.

In a paper read before the Electrical Communication section of the International Electrical Congress in St. Louis last year, Mr. LeRoy W. Stanton gave certain description of a system in which a subscriber's call, upon being placed by lifting the receiver from the hook, would operate in the central office a line relay quite as in present lamp signal practice. This line relay, however, instead of lighting a line lamp would set in motion a simple automatic selector supposedly somewhat similar to the selector which is commonly permanently connected to a subscriber's line in the Strowger system. This selector, instead of requiring to lift its contacts successively to different levels, and then automatically to hunt for an idle trunk of a group, immediately, as energized, seeks such a trunk in its one and only level. This trunk, leading to an operator's position, would announce its activity, be answered, and in turn be connected to the line of the called subscriber, or to a trunk leading to the office containing that line.

The description as given by Mr. Stanton involves more features than those which have been referred to, but it is sufficient for our purpose to note that there exists a tendency toward the combination of automatic means of call placing or call distribution and manual means of ascertaining and supplying the desires of the calling subscriber. From a cursory view of the situation, there is reason to believe that an A Y combination, in which the human Y operators originally proposed are displaced by mechanism accomplishing the same results, might give a saving larger than that contained in the mere displacement of something over 25 per cent of the total investment in spring jacks and their cabling.

COMPETITION SHOWS UP CHICAGO BELL.

Competition, which is the life of trade, induced the Chicago Telephone Company to offer to furnish the city of Chicago telephone equipment at one-third the price it formerly had charged.

"It's no great concession, though," said one of the Independent telephone appliance manufacturers who submitted bids. "It's 75 per cent more than the city would have to pay if it bought its own equipment."

The city has not accepted the Chicago Telephone Company's offer, but has taken it under consideration.

Several weeks ago a Chicago paper called attention to the fact that the city was paying the Chicago Telephone Company $2,100 a year rental on its police and fire telephones. That amount is 5 per cent interest on $42,000, and the whole equipment could be bought for between $4,000 and $5,000. The aldermen were struck with the force of the argument and advertised for bids for furnishing 1,552 transmitters, 1,600 receivers, 1,210 induction coils and 150 portable stand telephones.

When the bids were opened in the city electrician's office it was found that the Chicago Telephone Company, which has been collecting $1.50 a year rent for each "set" it has furnished the city, had cut the price to 50 cents. Eight Independent concerns submitted propositions to furnish the city necessary equipments for police and fire telephones and keep them in order. Their bids ranged from $2,650 to $5,669.

One of the Independent bidders made the observation that the Chicago Telephone Company, to be on an equal footing with the others, should have submitted a proposition to rent the city equipment at the rate of 12½ cents a "set," and this was the way he explained it:

"There are 1,600 'sets,' so the Chicago Telephone Company would be getting $800 a year at its new 'bargain counter rate.' This would represent 5 per cent on an investment of $16,000—not a bad thing for the telephone company.

"The average price of the equipment, according to the bids, would not exceed $4,250. Five per cent on that would be $212.50, so it is easy to see that the Chicago Telephone Company, to be an equal competitor, would have to reduce its bid 75 per cent and offer to furnish its 'sets' at the rate of 12½ cents to the city."

It has been argued by the Independent manufacturers that it would be more economical for the city to own an equipment, as it would have $800 a year and pay for the equipment inside of six years.

INDEPENDENT CONNECTIONS.

The Morrow County Telephone Company of Mt. Gilead, Ohio, tried long-distance connections with the Bell lines May 9 and cut off the Bell connections July 18. The officers of that company have united in a public letter, in which they say:

"All of our subscribers were advised of the connection and allowed their choice of service. We found that nearly 90 per cent wanted the Independent connections and that we could reach many more stations over the Independent lines than we could over the Bell lines. During this entire period we have had but very few calls for points reached exclusively by the Bell and have had several dozen calls that could not be reached by the Bell lines."

Commenting upon the foregoing the Lafayette (Ind.) Journal says: "The two Independent companies in Indiana that have connected with the Bell within the past four years are maintaining connections with both the Independents and the Bell. They have evidently begun to realize that the demands for long-distance connections over the Independent lines are far greater than over the Bell lines and that it would be a serious loss to their business patrons to be deprived of the opportunity to connect with the 166,256 Independent telephones of Indiana, about six times as many as those of the Bell in the state."

ILLINOIS TRUNK LINES CONSOLIDATE.

The Citizens' Mutual Telephone Company is the name of a consolidation of all the trunk lines surrounding Paris, Illinois, which has just been consummated. A conference of the representatives from each switchboard within a radius of thirty miles of Paris was conducted, the following lines being represented: Vermillion, Flemington, Nevins, Brocton, Libertyville, Dana, Marshall, Grandview, Redmon, Chrisman, Newport, Sanford, Clinton and Scott Land. A corporation was formed and $50,000 subscribed as capital stock. This new company will construct a complete circuit around the city, and while it does not enter Paris it has first-class service with Terre Haute. An effort will be made to enter Paris over the switchboard of the Wabash Valley Telephone Company.

Questions and Answers

CONDUCTED BY J. E. KELSEY

I am a reader of TELEPHONY and am always interested in "Questions and Answers." I inclose herewith a diagram of a three-wire plan in answer to W. M. B. in August issue. The exchange is indicated at *E* and two stations at *1* and *2*. Each of these stations is equipped with a push button, p^1 and p^2, for the purpose of opening the line to central when it is desired to ring the other station. I have a case of trouble on a metallic circuit, with a board with three metallic and thirteen ground lines. We get too much cross-talk from

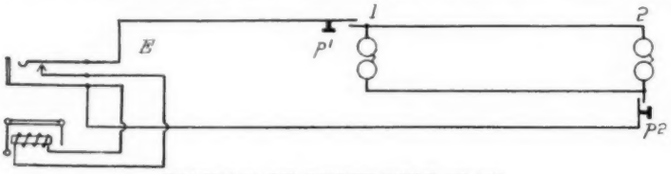


DIAGRAM OF THREE-WIRE PLAN.

it, and the line is transposed. We can hear subscribers on almost every line on the board. Where would you look for the trouble?—O. W.

It is possible that the metallic line may be grounded at certain points, at least enough to give the line the characteristics of a grounded line. At first thought the trouble might be in a common connection. Often boards are wired with one side common, which would then make all the three metallic lines cross talk, but this case of only one defective metallic line disputes the idea of a common connection. It must be outside trouble, a ground at some arrester, or some ordinarily hard trouble to see.

The inclosed diagram recently appeared in one of the telephone publications. I thought that it might be of interest to some of your readers to have this discussion extended. You will notice that the generator is bridged across the line at all times, which would permit the locked-out subscriber to ring and stop a conversation. In this style of circuit, where the selecting magnets bridge from one side of the line to ground, the other side should be kept clear of ground leaks. If they are not, I am sure that after the selection has been made and the generator current has been sent out metallic to ring the subscriber bell, it will divide and go to each ground. Would it not then unlock or throw down the selection? And by having the

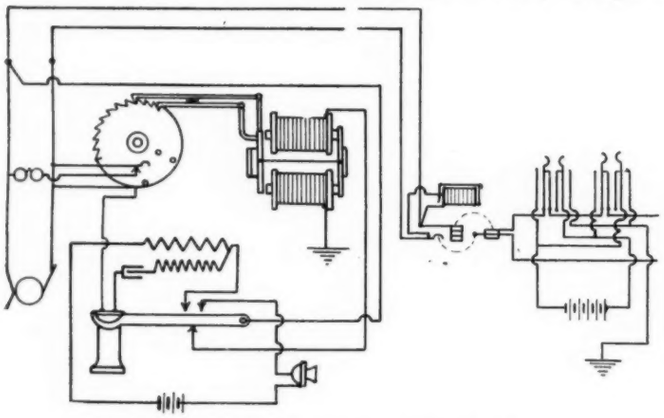


DIAGRAM OF SELECTIVE TELEPHONE.

selector magnets permanently grounded would it not make a common bridge ground line out of a metallic? The diagram shows that the circuit passes through the hook before going to the selector magnets. Would this not only cut off one ground at that telephone? With these conditions I do not understand how it gives the operator full control of the line. An up-to-date farmer might, after his bells had been placed across the line, put a toothpick under the hook and remain on the line forever. I would like to have you explain the need of a condenser as shown in diagram.—C. E. N.

C. E. N. described his system in the September TELEPHONY. I think the question secured results anyway. I would like to see the other lockout companies be as free with explanations. I have no apology to make, and clearly stated that I didn't know anything about the lockout business. I will admit that I personally saw a system which worked perfectly, and gave satisfaction. It surprised me, as I had always heard otherwise. So let some more explanations and descriptions come forward. I would like to learn more, as this *"fertile"* brain of mine has plenty of cultivating room yet.

I write you for some information. We have a rural line eighteen miles with a central located at one end. Now on this line, which, by the way, is full metallic, there are about twenty-four subscribers, the fartherest of these being out in the country about eighteen miles from central. Should this line be protected with lightning arresters or is there any apparatus which can be placed at central which will take care of the lightning out on all of this line?—W. H. P.

Some more lightning discussion. It beats the world how much of it can be done, and what little help it gives to fit specific cases. Here is a case of a metallic line, with twenty-four subscribers, and covering eighteen miles. Each instrument is in a dry, well insulated place, both sides of a metallic line are charged with an earth-seeking potential exactly alike. It stands to reason that the weakest spots on the line are not at the instruments, but somewhere on the wiring at the houses, or on the line. A line eighteen miles long could accumulate quite a heavy charge, which if not given a chance to leak away will grow to disruptive proportions, and jump. Where it would jump would be the path of least resistance.

Arresters at the exchange could be observed during a storm, and if the discharges seemed very sharp and decided, it would prove that more discharge area is needed. I would urge at least three carbon arresters, one of course at central office, and the other two near the middle of the line and near the end, at convenient places, where subscribers would examine the carbons after each storm. Put in good ground rods, and make the "path of least resistance" a reality.

To illustrate the fact that all calculations are merely guess work, I want to draft the following clipping:

LIGHTNING STRIKES PROPERTY.

Last Friday night an electrical storm of unusual violence passed over Bureau county and did much damage. The heaviest loss resulting was on the farms of B. C. Fear, near Kasbeer, and W. W. Miller, living three miles northwest of Wyanet.

The large barn of the Fear farm was entirely destroyed, together with the contents. The barn was insured for about one-half of its value, but the horses that were burned, four in number, and the hay, about twenty tons, and 700 bushels of oats belonging to the renter, Charles Wedding, were a total loss, as he carried no insurance.

The barn belonging to Mr. Miller was also destroyed and an adjoining crib, two fine horses, about thirty-five tons of hay, a lot of machinery and 600 bushels of oats, twenty tons of straw and a lot of chickens. Only about one-third of the loss was covered by insurance. Others who lost in the big storm were John Conley, southwest of New Bedford, who had a granary and contents, total value of which was $1,000, consumed by the fiery element. John Costello, living near LaMoille, lost two horses, struck by lightning in the pasture. Peter Swanlund, north of LaMoille, lost one fine horse in the pasture, and Kelly Odell, north of Walnut, lost three head of cattle. Henry Christianson, north of Princeton, lost a fine milch cow. The total loss in Bureau county for that night's wild work, was in the neighborhood of $10,000.

This was a severe storm, and yet Mr. White, the general manager of the telephone interests, informed me that they did not suffer seriously from lightning. Here were barns struck, horses in pasture struck, and the inductive effects must certainly have influenced the telephone lines in the county.

On the other hand, I have seen a 200-pair cable literally gutted by a bolt of lightning, with arresters at pole, cable

pole and at central office. Had a real bolt of lightning struck some of the Bureau county telephones, it is an easy bet they would have been destroyed, even though they had arresters. In old days, lightning created havoc in exchanges. It does not do so these days, not so much on account of better protection, but on account of the exchanges being on a metallic basis, and the path of least resistance has been shifted to some other weaker spot than the exchange itself. This does not detract from the beauty and efficiency of carbon arresters, as our common battery exchanges are still grounded systems, at central office battery, and are in the path of least resistance.

This same severe storm which affected Bureau county so seriously, passed out Chicago. It was a most peculiar storm, and the lightning played strenuously about in the sky. But few places were struck. My telephone line was not affected. The carbon arresters gave no evidence of any static strain. It goes to suggest that a city has so many discharge points that the bolts do not attain anywhere the dangerous striking potential of the country bolts. In fact, so many discharge points puts the telephone lines at practically earth potential, hence no inductive static charges can become effective, and nothing short of a real bolt does real damage.

If the district, in which W. H. P. lives in South Dakota, is given to savage lightning strokes, possibly more arresters should be used. Some companies protect each subscriber. I can't say that is necessary. Give your line a reasonable number of discharge points, and hope for the best.

Some time ago we had some investors interested in our telephone plant, but when they found that we had never taken depreciation into account they would not listen to our proposition. Our plant covers three counties, has a nice toll business, is five years old and in first class physical condition. Have we done serious wrong in neglecting depreciation, and what should we do in the future?—W. J. S.

As an answer to this query, I am going to assume a condition and make a story of the average growth of many of our Independent telephone enterprises.

First of all, you installed 500 telephones in your county seat. The next year you installed 500 telephones in a neighboring county seat. Then there arose a clamor for telephones from the different districts, and in the third year you placed 500 more. The fourth year you placed 500 more, and the fifth year, by reason of the increased district growth, you were obliged to add 500 more telephones to the county seats.

In all, you have 2,500 telephones. They cost you $50 each to install, making a total investment of $125,000. (By this time you are asking yourself, how does this connect with depreciation?)

The first year you put $25,000 into the first plant. By reason of its isolated situation, it is only worth $25,000, what you put in only.

The second year, you put $25,000 into the 500 telephone plant in the neighboring county seat.

By reason of the second plant and the first plant, you have started a nice little toll business. By reason of a toll business your county seat plants have an added value as toll terminals. It gives your subscribers a wider latitude, and adds to the utility of your plant.

Your plant cost you $50 per telephone. By reason of the change in conditions, it is now worth $60 per telephone, or $60,000, which is $10,000 more than you put in.

The third year, you added 500 more telephones, which gives connections between 1,500 subscribers. The individual advantages are increased, the toll terminal value is increased, and the utility is increased. The 500 telephones cost you $50 per telephone to install, but with all the increased functions, it is worth more. You have put $75,000 in your 1,500 line plant, and it is now worth $70 a telephone, or $105,000, which is $30,000 more than you put in.

The *fourth* year you put in 500 more telephones at $50 each. You have added something to the 1,500 telephones already installed, and these 1,500 have added to the functional value of the new 500. You now have 2,000 telephones, which cost you $50 each to install. You have $100,000 in the plant. Each telephone now is worth more money on account of the increments.

The 2,000 telephone plant is now worth $80 per telephone, or $160,000, which is $60,000 more than you put in.

By reason of the added country business, the county seats demand more telephones, so in the *fifth* year you add 500 more at $50 each.

These new 500 subscribers add to the individual functional values of each old telephone, and these 500 new ones are worth more by reason of the 2,000.

Instead of $80 per telephone, the 2,500 telephone plant is worth $90 per telephone, or $225,000. The plant cost $125,000 to build, which leaves a gain of $100,000 for five years.

You have now reached a maximum number of telephones in your district, which can be installed for $50 a telephone. Your plant is no longer gaining in value due to the increments caused by additional telephones. *You are at a standstill.* For five years your property worked while you slept. It works no longer. It is at this moment another condition confronts you. It is *depreciation.* When the value of the property was enhanced daily by natural growth, depreciation did not get a look in. Why bother the books with items of that kind? Why? Just look at the property, which shows a gain of $100,000. Surely, depreciation is covered by this.

When the *standstill occurs, then earnings of the operating forces must provide for depreciation.* There is *depreciation,* and *none can deny.* It is *inevitable* as *death* and *taxes.*

In this *ideal* plant, at the end of the sixth year, the earnings of the company must provide the depreciation account with $12,500, or ten per cent. (Practically, it is five per cent, as real estate and many other things really appreciate.)

In the seventh year, it happens that the Bell Company announces the expenditure of $50,000 in the two county seats, installing complete common battery plants.

From this moment, your local battery 1,500 subscriber plants are doomed. You, too, are up against the $50,000 common battery proposition. Luckily, you have partially foreseen this contingency, and in your sixth year set aside $12,500. You will need $37,500 more. Your plant has cost you $125,000. It is worth $225,000. You are really $100,000 to the good. By capitalizing at its honest value you can easily raise the $37,500, build the plant and still be much to the good. The new plant will show a better net earning, and the depreciation account will not be as much of a burden. This sounds just like "They were married and lived happily ever afterward," but I just wanted to illustrate the idea, that under ideal conditions, depreciation need not be considered for a time. Our ideal plant worked nicely, but in real life, of course, the gain of $10 per telephone annually may not always materialize. Even if it had gained but $5 per telephone annually, it would take care of the depreciation.

If the plant of W. J. S. has ignored depreciation for five years and now needs new money to replace old equipment, and cannot show that the real value of the plant and the real cost of the plant makes a difference which will buy the needed new equipment, serious wrong has been done. If they have paid dividends, and have been extravagant as well, and have not maintained the plant properly, and are developing a country which does not work out as our story goes, they must at once rigidly adhere to a liberal depreciation charge, even if they have to stop dividends, because the future will be much more disastrous

than the effects of the present, due to stoppage of dividends.

Most Independent plants have been built out of earnings. Their growth has been slow. Extravagance is absent. They have never had money to burn like the Bell Company professes to have, but have not. Each additional telephone does add an increment to each original telephone, just something like an inch pipe thirty-two feet high, inserted in a barrel, will when all filled with water, exert fifteen pounds upon every square inch of the barrel interior. Each new telephone adds more value to the plant. All Independent plants should begin now to charge depreciation if they have not done so. The past can be forgotten. The depreciation fund can be loaned to the construction fund. But it must be accounted for.

If you are paying dividends clear up to fifteen per cent, you must stop it, and take heed for the morrow.

Is it known when girl operators replaced the boys, and who first gave the order for the change?—D. C. L.

I read somewhere, lately, too, of something bearing on this question. As I am away from my reference, I am unable to tell you of the article.

I do know this, that Mr. G. H. Glass, now general manager of the Citizens' Telephone Company, Pekin, Ill., replaced the boys with girls in Richmond, Va., long ago. I believe Richmond had the second telephone exchange in our country. Anyway, Mr. Glass was very early, and deserves credit for his courage. It is a sure thing, that if we had boy operators, there would be occasional manslaughter, where now a simple disagreement often results. If the Automatic Electric Company had a boyless system to sell, I have no doubt of the sweeping adaptation of the system.

I have noticed for some time that some of our readers send in questions under the impression that TELEPHONY might charge for the answer. We want every reader to contribute some question, which appeals to them, even though they themselves know the answer. That does not matter, for there are some that might not know it, and to others it might give a new and useful idea. TELEPHONY invites every one to use the query columns freely.

We have built a line eight miles long with seven instruments upon it and have grounded them all good. The line when connected up with our local lines is all right, but just as soon as we connect up with the trunk line it is so noisy we cannot hear the least sound over it in either direction. We have changed it to different drops, but it does no good. I would like to have you make an answer to this inquiry, as it is something that I or several others cannot understand. Is there any place where I can get a good motorcycle? If so, please let me know at the earliest date possible.—R. G. W.

Now, in your case, if your trunk line is grounded, and is normally quiet, but is noisy when corrected to the eight-mile line, it would tend to show that your eight-mile line adds a greater area of electrical stress to the connection.

But I can't reconcile the connection when a grounded local line is connected to a grounded trunk line quietly, and with another grounded line, is not. Let us know what your trunk line is, metallic or grounded.

For a purpose, I will assume your trunk line to be a long toll line, metallic, and running through a district with many trolley and electric light lines present. And I will assume your eight-mile line to be metallic, with a ground on it somewhere.

As long as you connect your eight-mile line to your local lines, no noise occurs, simply because the short lines are not exposed to inductive effects.

But when you connect the eight-mile line to the long trunk line, a great noise happens. It happens because your long line is stored with static charges in a state of stress, which, when they are connected to a short line with a weak or grounded spot, allow the charges to flow off the long toll line unequally.

J. F. BUTTERFIELD KILLED AT CINCINNATI.

J. F. Butterfield, president of the Butterfield Construction Co., 113 Adams street, Chicago, was fatally injured at Cincinnati, Ohio, Tuesday, Sept. 19, while engaged upon a large conduit contract for the Cincinnati Gas & Electric Company.

A massive beam, which was being taken to the top of a new building, slipped from the ropes by which it was being hoisted and, falling eight stories, dropped upon Mr. Butterfield, crushing him into the earth and inflicting injuries from which he died within an hour.

J. F. Butterfield was well known in the telephone field. He built complete telephone plants within the past two years at Holdredge, Oxford and Grand Island, Neb., in all of which he held interests at the time of his death. He also did the underground work for the Independent companies at Kokomo, Logansport, South Bend, Bluffton, Anderson, Marion, Muncie and other Indiana cities, as well as at Danville and Champaign, Ill., and at Duluth and St. Paul, Minn.

The Butterfield Construction Company was organized by him last spring, and it is said he had plans on foot for important operations at the time of his death. It is said that his son, Harry, a young man, who has been his father's assistant in all of his undertakings of recent years, will continue the business and will undertake the execution of his father's plans.

Mr. Butterfield was a native of Lockport, N. Y., and was 44 years old. He was for some years prior to his operations in the telephone field, engaged with the Postal Telegraph Co. He was a member of the Odd Fellows, Knights of Pythias, Royal League, Royal Arcanum, Ravenswood Club and other organizations. He is survived by his widow, one son and three daughters. The body was taken to his home, 3203 Beacon street, Chicago, where the funeral was held on Friday, Sept. 22.

JOINS INTERESTS WITH WESTERN UNION.

It has just become known that a big deal was consummated between the Western Union Telegraph Company and the Utah Independent Telephone Company by Managing Director Elmer B. Jones at the time of his visit to New York last May, says the Salt Lake City Tribune.

Managing Director Jones declines to give the details of the deal, but enough is known to justify the statement that a contract was entered into between the two companies establishing the closest possible relationship for exchange of messages and use of each others pole lines in the inter-mountain region.

When asked what effect this contract would have on the future operations of his company, Mr. Jones stated that it would enable them to reach at once many points which would otherwise take time. "For instance, we can now reach Los Angeles over the Western Union poles along the San Pedro railroad."

Mr. Jones was asked if this deal meant an alliance between the Western Union Telegraph Company and the Utah Independent Telephone Company generally as against the Postal Telegraph Company and the Bell Telephone Company. In answer to this question he said it had been a conviction of his for a long time that such an alliance would be formed, and that he believed the time was not far distant when two great rival companies would be incorporated for the purpose of carrying on telephone and telegraph business in the United States, and this may be the beginning.

In the Financial Field

KINLOCH BONDS FIND READY SALE.

THE Kinloch Long-Distance Company of St. Louis recently announced for sale an issue of $1,000,000 in five per cent bonds, and before the bonds had been on the market a week 90 per cent of them had been disposed of, showing in an unmistakable manner the popularity of the Kinloch with investors. In a circular relating to its most recent bond issue the Kinloch company says:

"These bonds are a first lien on all the property and franchises of the Kinloch Long-Distance Telephone Company, and a lien upon all the properties of the Kinloch Telephone Company of St. Louis, subject only to a lien of its $2,000,000 of bonds. The local company has paid dividends of four per cent for four years upon its stock, and in 1904 added three per cent to its surplus.

"Based upon the market value of its stock, which has been selling on the market at from $75 to $80 per share, the equity of the Long-Distance company in the local company's properties has a value of $1,875,000. The Long-Distance company has expended in construction and equipment of its own lines the proceeds of bonds to the amount of $1,500,000, and proceeds of stock at par, $400,000, making the total value of the security behind these bonds $3,775,000, or more than two and one-half times the amount of the bonds outstanding.

"The net earnings of the combined properties for 1904 amounted to $311,000, and for 1905 are estimated at $350,000. Considering that the long-distance company has acquired extensive and productive new properties during 1904 and 1905, this estimate appears to be quite conservative. Based upon this estimate, the net earnings will be $350,000, and after paying interest on the local company's bonds, $120,000, there will remain the sum of $230,000, or over three times the interest on the bonds outstanding.

"It is expected that these bonds will be listed on the St. Louis Stock Exchange. Price of bonds, 97 and interest, subject to advance or prior sale."

* * *

DAKOTA CENTRAL TELEPHONE COMPANY.

The Dakota Central Telephone Company, organized August 30, 1904, under the laws of South Dakota, as a consolidation of the Dakota Central telephone lines, Southern Dakota, Southern Minnesota and Central Dakota Telephone company, reports:

Stock authorized: Common, $3,000,000; preferred, 6 per cent cumulative, $2,000,000. Stock outstanding, common, $1,085,650; preferred, $9,000; par of shares, $100. Authorized bond issue, $500,000 of 5 per cent first mortgage bonds dated June 1, 1905, and due June 1, 1915, without option of earlier redemption; denominations, $500 and $1,000. Interest payable December 1 and June 1 at the Aberdeen (S. D.) National Bank, of which John C. Bassett, the mortgage trustee, is president. Amount of these bonds outstanding, $100,000, covering 68 exchanges, about 9,000 telephones, 4,000 miles of pole lines and 7,000 miles of circuit wire. No prior liens are outstanding. President, J. S. W. Zietlow; secretary and treasurer, W. G. Bickelhaupt.

* * *

TELEPHONE COMPANIES MAY CONSOLIDATE.

One of the things that may come in the future is the consolidation of the Cuyahoga Telephone Company and the United States Telephone Company. The consolidation of this Cleveland company and the long-distance company in Ohio would be very attractive and, it is believed, would strengthen the securities of both concerns. It is known that the consolidation has been talked over by certain members of the Everett-Moore syndicate, but it is not a matter to be worked out in the immediate future, and yet it may come at any time. The company would save a little money in operating as a result of the consolidation, but would gain most from the fact that the consolidated company would be twice as large as either one of the companies going into the consolidation and in that way would be more apt to attract large investors. The consolidation could be brought about without a dollar of new money. The combined bonds issued by the two companies are $4,785,000. The combined preferred stock of both companies is $2,000,000, of which $1,500,000 is Cuyahoga and $500,000 is United States. The combined common stock is $3,500,000, of which $1,500,000 is Cuyahoga and $2,000,000 is United States, making a total capitalization of about $10,285,000. The two companies will earn this year over $1,000,000.

* * *

D. & M. MAKES A GOOD STATEMENT.

The following is the statement of the Delaware & Madison Counties Telephone Company for July:

	1905.	1904.
Income from rentals	$7,047.36	$6,336.76
Income from tolls	1,502.88	1,258.03
Building rent	130.00	135.00
Discount	.....	.....
Allowances	25.00	31.18
Gross income	8,655.24	7,698.61
Operating charged taxes and insurance	4,433.55	4,006.87
Net income	4,221.69	3,691.74
Interest	2,174.20	1,666.66
Surplus for stock	2,047.49	2,025.08

Statement for seven months ending July 31:

	1905.	1904.
Income from rentals	$51,127.19	$42,869.84
Income from tolls	10,237.05	8,450.02
Building rent	903.30	945.00
Discount	25.00	131.90
Allowances	227.89	498.08
Gross income	62,064.65	51,898.68
Operating charged taxes and insurance	31,068.53	25,541.22
Net income	30,996.12	26,357.46
Interest	14,590.11	12,006.72
Surplus for stock	16,406.01	14,350.74

* * *

BELL AND KEYSTONE TELEPHONE COMPANIES' BUSINESS.

The "new blood" in the Keystone Telephone Company of Philadelphia is causing the Bell company of that city much uneasiness. The indications are that this year the Keystone will earn net fully one and one-half times the amount required to pay the interest on the $4,000,000 5 per cent bonds it has just sold, and the Bell, which pays 6 per cent dividends, should show at least 10 per cent earned, or $600,000 surplus over the $840,000 necessary for the dividend. The announcement that the Keystone plant has cost $5,053,000 to date shows that this company now has an investment in plant equal to nearly one-half the cost value at which the Bell company carries its plant on its books.

* * *

BRIEF FINANCIAL NOTES.

The Dekalb County (Ill.) Telephone Company has increased its capital stock to $60,000.

The Daleville (Ind.) Telephone Company has declared a semi-annual dividend of 4 per cent.

The Consolidated Telephone Company, Allentown, Pa.,

has decided to spend $200,000 in overhauling and improving its plant in this city and Hazelton.

The Luther (Ind.) Telephone Company has increased its capital stock from $5,000 to $20,000.

The Citizens' Telephone Company of Decatur, Indiana, has declared a dividend of 6 per cent.

The Salina (Kan.) Telephone Company has increased its capital stock from $100,000 to $150,000.

The Clinton (N. Y.) Telephone Company has increased its capital stock from $50,000 to $100,000.

The Fairfax Telephone Company, Fairfax, Missouri, has increased its capital stock from $18,000 to $24,000.

The Daviess County Home Telephone Company of Washington, Indiana, has issued $100,000 of preferred stock.

The Martin County Telephone Company of Llano, Texas, has increased its capital stock from $10,000 to $20,000.

The Clinton Telephone Company of Plattsburgh, New York, has increased its capital stock from $50,000 to $100,000.

The stock of the Home Telephone Company of Los Angeles, which a year ago sold at $40, is now selling at $65 to $70.

The Decatur (Ala.) Long-Distance Telephone and Telegraph Company has increased its capital stock from $500,000 to $1,000,000.

In order to extend its system, the Whitecloud Telephone Company, Whitecloud, Kansas, has increased its capital stock from $75,000 to $150,000.

The Steuben County Electric Telephone Company of Angola, Indiana, has increased the capital stock of the company from $50,000 to $100,000.

It is reported the Fitzsimmons Telephone Company of Cincinnati will be increased in size, having a capital of $8,000,000, divided into $10 shares.

The directors of Columbia Telephone Company of Hudson, New York, have declared the fourth quarterly dividend of 1¼ per cent payable October 1.

The Cuyahoga Telephone Company, Cleveland, Ohio, has 18,000 subscribers. Its gross earnings for this year are $551,475.13, with a surplus of $105,542.23.

The annual report of the Farmers' Mutual Telephone Company of Columbia City, Indiana, showed receipts of $20,821.33 and expenditures of $20,520.94.

The directors of Farmington Valley Telephone Company of New Britain, Connecticut, have declared a semi-annual dividend of 3 per cent, payable October 1.

The capital stock of the LeMars (Iowa) Telephone Company has been increased from $50,000 to $100,000.

The directors of the Tri-State Telephone & Telegraph Company, Minneapolis, Minnesota, have declared the ninth quarterly dividend, at the rate of 6 per cent per annum.

The Little Rock (Ark.) Telephone Company has filed a deed of trust to secure a bond issue of $200,000. The money will be used in enlarging and otherwise improving the plant.

The Valley Telephone and Telegraph Company of Green Bay, Wisconsin, has changed its name to the Fox River Valley Telephone and Telegraph Company and increased its capital stock from $250,000 to $350,000.

F. E. Gardner, secretary of the Daviess County Home Telephone Company of Washington, Indiana, has filed a notice with the secretary of state showing that $100,000 worth of preferred stock has been issued by the company.

A point that seems not to have been made public before, in connection with the Keystone Telephone Company's financing, is that the preferred stock may be retired, under certain conditions, and that $2,500,000 of the new bonds are reserved for this purpose.

Julius Christensen & Company, with offices in the Drexel building, Philadelphia, are offering for sale first and refunding 5 per cent mortgage bonds of the Diamond State Telephone Company, representing $150,000. The bonds can be purchased in demoninations of $500 and $1,000. All are dated July 1, 1905, and will be redeemable at par after July 1, 1913.

Since increasing the capital stock of the Sandusky (Ohio) Telephone Company to $150,000, the stockholders have concluded to arrange for a refunding of the present indebtedness of the company. A new bond issue will be made to take up all outstanding bonds.

The directors of the Toledo Home Telephone Company, Toledo, Ohio, at a recent meeting declared the customary 1 per cent quarterly dividend. The directors also decided to increase the wages of all operators about 10 per cent. The increase was entirely voluntary.

At the annual meeting of the Ontario and Steuben County Telephone Company of Naples, New York, the capital stock of the company was increased to $30,000 under a new corporation, and the number of shares increased from sixty-five to 2,000. The purpose of the company is to greatly increase the extent of its business.

The stockholders of the Eastern Telephone & Telegraph Company of Camden, New Jersey, have ratified the action of the board of directors in issuing $1,000,000 worth of consolidated mortgage bonds to bear 5 per cent interest. The money so derived is to be used in extending the lines of the company through South Jersey.

The Union Telephone Company, Galesburg, Illinois, is considering extensive improvements which will necessitate the expenditure of about $50,000 for long-distance metallic circuits which will be built to Rock Island, Davenport, Burlington, Quincy, Springfield, Aurora, Peoria and other cities. The company will increase its capital stock from $150,000 to $250,000.

A trust deed for $3,000,000, covering an issue of bonds for that amount, has been filed by the Utah Independent Telephone Company to the Utah Savings and Trust Company of Salt Lake City. The bonds are 6 per cent gold bonds of various denominations. The mortgage is given to cover existing indebtedness and to provide for future development of the company's business.

At a recent meeting of the stockholders of the York Telephone Company, York, Pa., it was decided to increase the capital stock from $200,000 to $500,000. Many improvements are to be made by the company, one of the most important of which is placing the wires in the city underground. Changes will also be made throughout the country and lines will be extended in all directions.

The Home Telephone Company of Mobile, Alabama, has voted to increase its capital stock to $350,000, and to issue bonds in a like amount. The proceeds are to be used in the extension and betterment of the plant. Prominent northern capitalists have become interested in the Home Telephone Company. Under the new management it is proposed to make the plant one of the finest in the country.

At the annual meeting of the Inter-State Telephone & Telegraph Company, held at Aurora, Sept. 11, 1905, the seventeenth regular quarterly dividend of 1 per cent was declared on the entire capital stock of the Inter-State company. The report for the fiscal year ending June 30th also showed an increase of nearly $20,000.00 in the surplus over and above fixed charges including interest and dividends, which was considered by the full board to be very satisfactory.

At a meeting at Wapakoneta, Ohio, of the bondholders' committee of the Commercial Telephone Company of Texas, steps were taken to reorganize the company. The committee represents nearly $300,000 worth of bonds owned in Ohio, Indiana and Kentucky, and has won out in all litigation, and last month, in Travis county, Texas, bought in all the property of the company for $110,000. The committee will organize a new company with a capital stock of $500,000. The old toll lines will be repaired and extended into other states.

The Capacity of a Condenser

G. W. WILDER

THERE have been a great many methods described for measuring the capacity of a condenser. Most of these are to be found in text books and treatises on advanced electricity and magnetism, although not a few occur in technical magazines. The majority of the methods described depend for their operation upon the use of expensive and delicate apparatus and a consequent technical knowledge and skill on the part of the one making the test. Simple methods capable of a rough and ready treatment are few and unsatisfactory, the reason being, perhaps, that until recently there has been no demand for such methods among non-technical men.

Now that condensers are being used to such a great extent in telephone work, it is desirable that there should be some method of measuring capacities simple enough to appeal to the average exchange manager. Such a method should not require the use of apparatus other than that usually found in an ordinary exchange, and should be entirely free of those conditions that so frequently introduce bothersome corrections in the more elaborate methods.

One of the simplest methods known, and the one most commonly employed in laboratories, is that of direct comparison between a standard condenser and the unknown. A fairly good battery, such as a dry cell, is connected up with a condenser, key and galvanometer, as shown in Fig. 1.

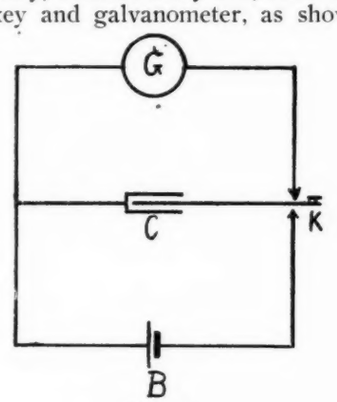


FIG. 1.

When the key K is depressed, the battery charges the condenser C, and when the key is released, it makes contact with the upper portion of the circuit which causes the condenser to discharge through the galvanometer G. Since the relation between the quantity Q, capacity C, and potential E, is expressed by the equation

$$C E = Q,$$

it is easy to compare capacities, for the quantities are directly proportional to the deflections produced by the galvanometer needle.

A standard condenser is placed in this circuit at C, and charged and discharged several times, the corresponding deflections of the galvanometer needle being noted. The magnitude of the deflections are regulated by either the battery or the galvanometer. An increase in battery power will give a proportional increase to the deflections. If it is found that one cell of battery is too large and the needle deflects off the scale, a shunt on the galvanometer may be used, although it is better in this case to shunt the battery through a high resistance and then pick off a fraction of the total fall in potential over this resistance.

After having obtained a set of readings on the galvanometer, the standard condenser is removed and the condenser whose capacity it is desired to find is substituted and a similar set of readings obtained. A comparison of the average values of the two sets will give the capacity of the unknown condenser.

When the capacities thus compared are nearly equal, the method is simple enough, and the values are fairly accurate, but when there is a wide discrepancy between the value of the standard and that of the unknown, corrections will have to be taken into account, because the quantities discharged through the galvanometer will not be accurately represented by the scale readings. This is especially true when the latter are very large.

Another disadvantage of this method lies in the use of the galvanometer. A type called the "ballistic" must be employed in such a test, and often this is hard for a novice to understand and manipulate. The discharge of a condenser causes the moving system of the instrument to swing and the magnitude of the first swing is taken as representative of the quantity discharged. It is evident that considerable practice is necessary in order that one may accurately observe the extent of the swings.

Another objection to the above method is met with when ordinary telephone condensers are used. The capacity of the average condenser is found to depend greatly upon the length of time it is left connected with the battery. There seems to be a "soaking in" effect that is often very large. Similarly, upon discharge, there is left a residual charge which may amount to a considerable percentage of the original charge. So the capacity of a telephone condenser is a hard thing to measure by any of the ordinary galvanometer methods.

A simple way to obviate the difficulties due to the time during which a condenser is undergoing charge is by using a method in which the condenser is alternately charged and discharged. Of course, it would be expected that even in this case the frequency of the alternations might affect the results and they probably do, although it is found that such effects are too small to be taken into account.

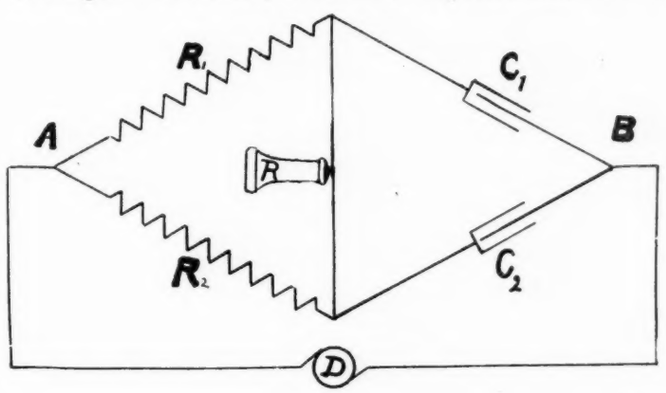


FIG. 2.

The following method is based upon one of the so-called "bridge" methods in which a source of alternating current replaces the interrupted current and a telephone receiver replaces the galvanometer. An ordinary ringing machine or pole-changer, D (Fig. 2), is connected to two points, A and B. The two condensers C^1 and C^2 are placed parallel to each other and in series with two resistances R^1 and R^2. These resistances are variable rheostats such as are found on

any resistance box of the "post-office" type. A receiver, R, is placed between the two branches of the bridge and acts as a galvanometer.

When the current is turned on the receiver is affected and immediately gives forth a tone corresponding to that of the ringing machine. The resistances R^1 and R^2 are now manipulated until the tone in the receiver disappears or is at least a minimum. When this condition occurs there is no current flowing through the receiver circuit, which means that the fall in potential at its connecting points is zero. If actual resistances were in the place of the condensers the bridge would be said to be balanced, and the following proportion would be true:

$$\frac{R^1}{R^2} = \frac{C^1}{C^2}$$

where C^1 and C^2 represent actual resistances rather than capacities.

A condenser, however, acts just like a resistance to alternating currents and in such a case has a magnitude of $\frac{1}{2\pi n C}$, where n is the frequency of the alternations and C is the capacity. The above equation becomes, then,

$$\frac{R^1}{R^2} = \frac{2\pi n C^2}{2\pi n C^1}$$

$$\text{or} \qquad C^1 = C^2 \frac{R^2}{R^1}$$

If the capacity of C^2 is known, then C^1 can be determined from the ratio of R^1 and R^2.

The following measurements were taken in order to see what could be done with an ordinary ringing machine used as the source of current. The machine gave a pressure of seventy-five volts and a frequency of about fifteen. A standard one-third microfarad condenser was balanced up against one of three-fourths m.f. capacity, the former being used as the standard. The following data was obtained:

R^1	R^2	C^2	C^1
1140	1000	0.33	0.292
4040	3500	0.33	0.288
10000	9000	0.33	0.300

A slight increase in the capacity is noticed when larger values of resistances are used. This is due to the absorption effect in that the charging e.m.f. is cut down by the resistance. It was noticed that it took only four ohms change in R^1 and R^2 to make a perceptible change in the receiver in the first instance, while it took forty in the second and about four hundred in the last one to make a change. This shows that the lower values give a more reliable determination of the unknown capacity.

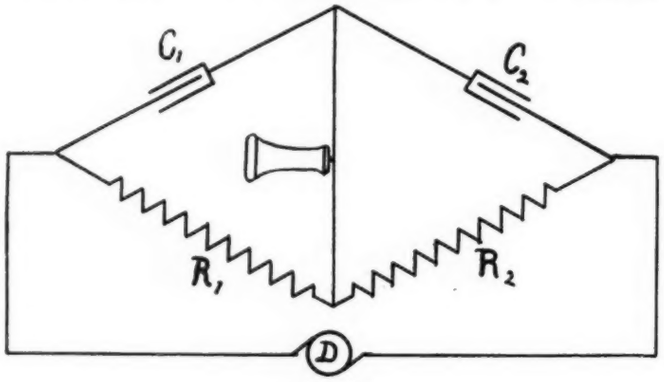


FIG. 3.

A second scheme may be followed equally well, by interchanging the relative positions of the condensers and resistances as shown in Fig. 3. In this diagram it will be noticed that the two condensers form one side of the divided circuit, while the two resistances form the other side. The following set of readings were obtained, using the same condensers as in the above experiment.

R^1	R^2	C^2	C^1
5000	4400	0.33	0.293
8000	7000	0.33	0.291
1020	900	0.33	0.294

A telephone condenser was inserted at C^1 and the two condensers used above were joined together in multiple as the standard C^2. The following data was then secured:

R^1	R^2	C^2	C^1
570	1040	0.626	1.142
3540	6600	0.626	1.183
5900	10900	0.626	1.157

This method is somewhat better than the one previously described. A better balance can be obtained, although in neither case can the telephone receiver be made silent. There is always some leakage effect present, enough to operate the receiver at least, so that a minimum weakness in tone is sought when balancing up the resistances. The method has the advantage of simplicity, accuracy and rapidity. An ordinary testing set can be used for the resistances, the limits of accuracy are well within those demanded in practice, and the scheme is rapid to manipulate.

A change in the frequency of the ringing machine was found to make no difference in the above results. A change in electromotive force offers a small change in capacity, although very slight. Hence, the above methods will be found to be very satisfactory in testing the average telephone condenser.

TELEPHONE SITUATION IN NEW ORLEANS.

There is renewed agitation among the business men of New Orleans to force the Cumberland Telephone Company to completely reorganize its system in that city, the present service being pronounced as atrocious and calling for immediate and radical improvement or the establishment of an Independent exchange in the Louisiana metropolis. This protest of New Orleans citizens against Bell methods is the result of continued failure on the part of the Cumberland company to make good its promises of last spring to the effect that its service would be improved at once.

General discontinuance of the party lines is alleged by the Cumberland company to be the only solution of the difficulties that beset its patrons. The patrons, on the other hand, complain that the difficulties are just as evident on the direct as on the party lines. In consequence, the organized movement, begun by the Progressive Union, is soon to take steps to force the use of underground wires in the business district, and along the chief residence thoroughfares.

The railroad commission, which last spring made the company reduce its rates on the direct lines, but permitted it to keep up rates on party lines, as a temporary measure, to force trial of the direct lines, will be again asked to intervene, and effect a greater reduction in rates unless the company, within a given time, does not greatly improve the service.

TELEPHONE TOWERS TO SPAN RIVER.

On each bank of the Missouri river two miles south of Council Bluffs, Iowa, the Indepenaent Telephone Company of that city will erect towers of steel 125 feet high for the purpose of stretching cables across the stream to connect Council Bluffs with South Omaha. The structures will need to be very strong, as they will have to bear the weight of several lines of cable. Omaha, which has no Independent exchange, will be left out, while Lincoln, Sioux City and Des Moines, its trade rivals, will get the benefit of the interstate connection.

DIGEST OF TELEPHONE LITERATURE

Conducted by Samuel G. McMeen.

Low Rates in Sweden—SITZENSTATTER.—*Telephone Journal, September 16.*

FINANCE AND ECONOMICS.

Two things are notable in connection with Swedish telephone service: One is that the development is very large, and the other is that the rates are very low. There are three systems in use, one being Bell, another Independent, and the third that of the Government. The equipment for all classes is exactly the same, and transmission and other features of service are quite uniform except as to regulations concerning numbers of calls and directory destinations. For instance, a subscriber paying the highest rate may be called by other subscribers without their being charged for the calls, even though they are paying on a measured service basis. That is, if your grocers pays the highest rate, you may call him free. If he pays a lower rate, you must pay for your call to him. Another oddity is the fact that, as there are many subscribers in one central office, there are some numbers of five figures each, and if you pay a high rate, you may have a small number. In Stockholm the development is 16 per cent. This, on a fair assumption of sizes of families, mean an average of one telephone per family.

Well Telephoned Territory—REILLY.—*Electrical Review, September 9.*

Some description of the Bell development in the territory operated by the New York and New Jersey Telephone Co.

Organization of a Telephone System—STORY.—*Telephone Journal, August 26.*

A statement of the conveniences and advantages of using an organization chart as a guide to the official routine, and as the means of keeping clear in the minds of the personnel of departments what are the duties to be performed and what are those to be avoided. An example of such a chart showing graphically the elements and interrelations from the president to the stable-boss is included in the article, and is accompanied by comment upon the duties and responsibilities of the various branches.

Independent Progress in New Jersey—TYLER.—*Telephone Journal, August 26.*

An illustrated description of the equipment in Paterson, New Jersey, the equipment being of the manual, multiple type, being the third outfit used by the Independent company in that city. The first was destroyed by a disastrous fire which temporarily eliminated a large number of subscribers' stations, and the second was a temporary equipment.

Private Exchanges—COAR.—*American Telephone Journal, September 16.*

The demand for private exchanges grows greater year by year. There are in New York City over 5,000 of them, each not only a private but a private branch system containing more than 60,000 subscribers. The increase now under way is due to the recognition of telephone companies of the several advantages to be gained by them, and also to the advertising given by the satisfactory results secured by the patrons. Often there is difficulty in locating the equipment in the spare space for it. In such cases the telephone company must assist in securing a rearrangement of the office furniture, or design the switchboard so that it will fit the space which may be allotted it. Both the operator of the private branch board and the man who takes care of it work under difficulties, because of the surroundings and cramped conditions usually found. The article contains an illustration of good and bad conditions of things in these regards. The simplest and best arrangement of current supply is to secure it through special wires from the central office. If primary batteries must be used, a type should be chosen having a low internal resistance and a large current output. Dry cells are suitable for many forms of circuit, but if heavily worked, will be found expensive in renewals. A good type of wet battery for such service is the Fuller. Instructions for its use are given. If it is advantageous to provide insurance against possible failure of current supply when conductors from the central office are used for the purpose, a double-pole double-throw switch may be installed, enabling the battery wires to the board to be transferred from the central office conductors to an emergency primary battery on the premises. A similar means of transfer for ringing current is illustrated, as is also a multiple plug arrangement permitting many lines to be connected together over night.

Modern Telephony—RADCLIFFE.—*Telephony, September.*

EQUIPMENT.

The seventh article of a series, and deals principally with central office equipment, including protective apparatus.

Party Line Signaling—COAR.—*Western Electrician, September 9.*

The variety of opinions concerning party lines is largely due to defects of early apparatus. Of the many ways of accomplishing selection among stations, five have been particularly prominent. These are bridging a polarized ringer from each limb of a metallic circuit to earth; bridging biased polarized ringers similarly, two from each limb of the line to earth; signaling by pulsating currents using polarized relays in a similar manner, but ringing local bells by the contacts thus closed; associating polarized ringers with impedance coils and ringing with different frequencies, and constructing ringers so as to respond only to currents of predetermined frequency. Each of these methods is described in some detail. The author is distinctly favorable to the use of party lines, and believes that lockout mechanism will be found valuable when produced.

High Power Transmitter Tests—NABER.—*World & Engineer, September 9.*

A description of the Adams-Randall transmitter, which contains a plurality of carbon buttons. The article contains some description of tests of the device on lines carrying telegraphy at the same time.

Central Energy Systems—TAYLOR.—*Sound Waves, September.*

It was early recognized that the use of primary batteries at substations was unsatisfactory, but the problem awaited the invention of the storage battery. In a diagram, the author shows why the central source of energy must be one of low resistance. In another he shows how different lines may draw current from the same source without mutual interference. If the current is fed to the middle of the line formed by uniting two similar circuits in the central office, the supply being through a single pair of retardation coils, successful conversation is possible. If one line be long and the other short, the short line will secure current at the expense of the long line. By the use of repeating coils for this supply, or by the use of a pair of retardation coils per line, this inequality is obviated.

Tie Trunk Circuits—HERZOG.—*Telephone Journal, September 16.*

The title means lines adapted to enable two stations, one or both otherwise connected with the central office, to connect with each other without calling the central office. A number of forms of such an arrangement are shown, the object being to enable the exchange service to be protected in all of its usual facilities, while enabling the two stations

to call each other and speak direct. All but one of them are adapted for common battery systems, none are complicated, and none involve other than usual types of apparatus.

Los Angeles Automatic-Manual Working—HIGGINS.—*Sound Waves, September*

The article opens with interesting statistics as to the population of Los Angeles and other towns in the same county, giving the number of Bell and Independent telephones in each. The list is accompanied by history concerning the establishment and growth of these exchanges. An entire change in the industrial and economical methods of the Bell company is reported and accompanied by comment of both favorable and adverse character as to the policy shown by Independents in that region. Mr. Higgins expressed himself as being more than ever impressed that the telephone system of the future must be some form of automatic. In the present stage of development he is inclined to favor a semi-automatic in preference to a full automatic.

Secret Keyboard Circuit—BURLINGHAM.—*Telephone Journal, September 2.*

One of the advantages, and a twofold one, following the introduction of automatic supervisory signals, lay in the relief to the operators in not being required to listen in upon connections to determine whether conversations were completed, and the relief to the subscriber in the less frequent listening, in that is brought about. Some inventors have considered it wise to go further and compel the operator to depend wholly upon the showing of supervisory signals to know whether conversations were completed, any attempt to listen in being prevented by mechanical or electrical means. The invention described in this article accomplishes such results in connection with magnetic equipment. The strap wiring between the keys is such that when a listening key is moved to listen on either cord of a pair, the circuit is opened toward the other, and the operator also is prevented from listening simultaneously upon two cord circuits. The method of wiring is applicable to either vertical or horizontal keys, and to either magneto or common battery systems.

Rural Exchange Construction—STERRETT.—*Sound Waves, September.*

LINES AND LINE CONSTRUCTION.

All rural lines should be equipped with bridging bells, if there is more than one station per line. House wire should be of No. 18 gauge, and thoroughly soldered. Except because of cross talk, single wire lines are satisfactory in the country. Telephones should be protected with carbon arrestors, and it is of advantage in some ways to provide each set with a knife switch, which may disconnect the instrument from the line during storms. A coil resistance of 1600 ohms is recommended for the bridging bells, and it is urged that all of these bells be of one type. The practice of conducting regular inspection of the lines and instruments twice a year is strongly recommended, very valuable results having been secured in the experience of the author. No manufacturer is said to have successfully solved the design of rural exchange switchboards, as it is not sufficient to build them along the same lines as magneto boards for individual line work. Thirty to thirty-six poles per mile, twenty to twenty-five feet long, with No. 12 galvanized iron wire, is the general type of construction recommended.

Cables on Brooklyn Bridge—BOND.—*Telephone Journal, September 2.*

In earlier days paper insulated, lead covered cables were hung from Brooklyn bridge by suspension from messenger wires in the usual manner. It is recorded in this article that the sheaths of the cables cracked, because of the vibratory motion of the bridge structure. Moisture entered through the cracks, and the cables became defective. To obviate this difficulty, the cables were piled upon each other on wooden beams, and in consequence the lead sheaths were no longer damaged by cracking. Ultimately, for financial reasons only, the entire cable run was removed from Brooklyn bridge and laid in the bed of East river. The item is of particular interest for the reason that, in the face of rather conclusive evidence, some engineers have found it pleasing to deny that any such cracking may result from the crystallization of lead under continued vibration.

An article of general advice relative to the qualities required in local construction. Some of the requisites are thorough planning in advance, securing competent help, and choosing uniform and high-grade material. Modern methods required a liberal use of cable and the multiple tap plan is a decided improvement over the older use of many open wires.

Aerial and Underground Construction—CRAIG.—*Sound Waves, September.*

Conduit Construction—SLIPPEY.—*Western Telephone Journal, September.*

In locating the conduit runs for a telephone system, the main or feeder run is of first importance. It is not safe, however, to take for granted that this feeder must be on the main business street of the city. The number of ducts should be 75 per cent above the present requirements of the plant, and in determining this percentage, the cost of repaving after laying the additional ducts should be taken into account. In the outlying districts any lead carrying 200 circuits or more should go underground. There is no economy in laying less than a two-duct conduit, except in cases of laterals to buildings and pole tops. A good conduit material requires to be of low first cost and low cost of installation and maintenance, to be proof against abrasion, corrosion, and electrolysis damage, to be of reasonable strength and adapted for long life. It is the conclusion of the writer that vitrified clay is the only material fulfilling these requirements, except for laterals, for which iron pipe is recommended.

Wire for Telephone Purposes—WILDER.—*Sound Waves, September.*

Copper is the best material for telephone lines, as it possesses high conductivity, ductility, and strength, and reasonably low cost. The article contains details as to the weight and conductivity of wires, and from two or three of these forms practically all necessary resistance data can be determined for any wire. Similar forms are given in reference to aluminum and iron wires. As to the former, comment is made that it is objectionable because of its great expansion with increase of temperature. Instructions are given for applying tests to the various kinds of wires to determine whether they are mechanically suitable for use.

Fault Location—BIRKLEY.—*Western Telephone Journal, September.*

A description of an adaptation of the Murray loop test to the location of a ground on a cable conductor. In this arrangement no apparatus is required which is not immediately at hand in any telephone exchange in the country. The items involved are a battery, a telephone receiver, a board, three nails, and a piece of wire. One of the advantages of the method is its immediate convenience, and another is its certainty to impress the truths of the Murray method on any one who uses it.

Long Distance Lines Underground—World & Engineer, August 26.

Notice is given of the completion of a plan for laying wires underground between New York City and New Haven, Conn. Conduits already extending from New York to Portchester will be extended as far as New Haven, and into a conduit line, with manholes once per thousand feet, long-distance cables, presumably equipped with loading coil, will be drawn. It would seem likely that this is the first step toward wholly underground lines between New York and Boston.

Maintenance of Underground Structures—HUMISTON.—*Telephony, September 9.*

The third article of a series, and deals with methods of repair when cables are injured by the freezing of water in lateral pipes. One of the most satisfactory methods of releasing cables so frozen is to pass a considerable current over the sheath. This method sometimes is assisted by blowing steam into the lateral pipe around the cable. Often the pressure upon the cables is so great, when so frozen, as

to cross together the insulated conductors. When the pressure is released, the cables usually will expand enough to clear the troubles. Often the entrance of moisture at a splice will saturate the core of a cable for a short distance, and as the splices are always in manholes, it has been feasible to dry out cable cores by taking off the sleeve, inserting a long thin pipe into the core, and pumping hot air through the pipe. By using some details of drying as well as heating the air, it has been possible to recover conductors without taking much of the sheath from them, or being able to get at the core to boil it out at all. The article closes with a report of the discussion which took place when the paper was read.

Split Pairs—JAMESTON.—*American Telephone Journal, September 16.*

In splicing cables, the right way is to connect a pair to a pair. Sometimes one wire of a pair will be spliced to a wire of another pair, and this spoils two pairs in some degree. The difficulty is the cross-talk between the pairs thus laced together. This note gives a test using a tone and a telephone receiver in a method utilizing a bridge with variable arms. The tone is impressed on the end of the split pair, and the bridge and telephone are applied to the ends of the perfect pair. The bridge may be adjusted for silence in the telephone, when calculation by a given formula will locate the fault. The cable may then be opened at the indicated point and the splice corrected, which will restore two pairs to service, thus warranting the expense of opening the splice, if the cable is not a very short one.

Telephone Traffic—WEBB.—*Electrical Review, September 16.*

OPERATING.

A reprint of Mr. Webb's paper read before the British Institution of Electrical Engineers. He holds that a study of the traffic is the most important part of the work of the telephone man, and that as the sole object of a telephone system is to supply telephone communication, the very nature of the work of transmitting a great multitude of small messages enables small gains to sum up a valuable total. As noticed before in this department, the article is valuable particularly in its showing the elements which go to make up the unit of transaction and its comparison of time amounts expended in operating magneto and common battery systems.

Electric Railway Train Dispatching—PATRICK.—*Telephone Journal, September 9.*

The development of electric railroads of considerable length has rendered necessary some counterpart of the train dispatching system so long accomplished by the telegraph in connection with steam roads. Due to the absence of fixed stations, and to some other similarities to steam roads, the communication between the dispatcher and the trains crews must be direct, and not through a person regularly located and equipped for telegraphy. In some cases the results are accomplished by placing telephones in waterproof boxes at frequent intervals along the line. In others telephones are placed in the cars and connections are established by running the train near a jack box on a pole, and connecting the cord from the telephone to the jack. A variation of this flexible arrangement is to connect the car to the lines by a rod enabling the conductors to be hooked to the ærial wires. The Rochester & Eastern Railroad is an example of such an arrangement, involving a flexible cord normally wound upon a reel, and in an experience of a year and a half, highly satisfactory results have been secured. In addition to the telephone equipment, this road operates a complete system of records, and several of the forms, with comment upon them, are included in the article.

Special Information by Telephone—MCMEEN.—*Telephony, September.*

A note of a system enabling such information as the location of a fire to be given to subscribers without requiring that they call the central office in the usual way. The object of the arrangement is to enable regular exchange service to continue in small cities while the populace is excited over a fire, and would otherwise originate an excessively large traffic of inquiry.

Local Exchange Management—STORY.—*Telephone Journal, September 2.*

A plea for a clearer recognition of the responsibilities of the local manager in producing prompt, courteous, and accurate service. A bit of wisdom in the article is the statement that all complaints of irregularities should be handled on the primary basis, that they are justified. A thorough recognition of this great truth would result not only in an improvement of local service in many an office, but would simplify the trying duties of the management in a degree not appreciated without trial. It is recommended that the service should be produced in constant comparison with a standard, and it is assumed that this standard is not merely a general mental conviction that the service ought to be good, but a definite and expressed measure of how good each of the elements of service should be. In adjusting the amount of traffic to be handled by each position, the requirements of the busy hour should be kept in mind, as it is in this time that the operating force and apparatus is put to the severest strain. Team work is essential for good operating on a jultiple switchboard.

Alternating Current Electrolysis—WILSON.—*London Electrician, September 8.*

GENERAL.

A paper read before the Faraday Society. A portion dealing with the electrolysis of lead, when serving alternately as the anode and cathode, is of interest to telephone engineers, as it is the lead sheath of telephone cables which suffers by electrolytic action in the ground. It is probable that electric traction will in time utilize the advantages of alternating current, and in that case the present electrolytic prevention means must be revised.

Combined Telephony and Telegraphy—MCMEEN.—*Telephony, September.*

Morse telegraph circuits usually are equipped with instruments wholly in series. On the principle of the bridging telephone line, however, Morse lines may be arranged with station outfits in parallel with each other. Three drawings illustrate some of the means of accomplishing this result.

Cross-Talk—NEWTON.—*Telephone Journal, September 9.*

This troublesome phenomenon is said to be due to electromagnetic or electrostatic influences, or to both. Two diagrams illustrate the form of a current wave, and the conditions of charge which exist on the wires of a telephone circuit at given instant.

Testing Wound Coils by Induction Balance—*Sound Waves, September.*

A practical application of the induction balance of Hughes to tests on wound coils of similar type. Placing a wound or unwound spool in one half of the balance, practical silence will exist in the receiver when a wound coil of the same type is placed in the other side of the balance, unless the latter spool contains a short circuit between turns. If it does, the difference in the two sides of the balance will cause a loud tone in the receiver.

Twenty-four versus Forty-eight Volt Systems—SCOVILLE.—*Telephone Journal, September*

A discussion of the open question indicated by the title, and aims to be a statement of advantages and disadvantages. Naturally the chief requirement as to central office voltage is that there shall be provided, at the terminals of the substation transmitter, a sufficient pressure to insure satisfactory speech. It is the conclusion of the writer that the use of a forty-eight volt system as compared with that using twenty-four volts, entails a double leakage; a higher requirement of conductor insulation, hard enough to accomplish even with twenty-four volts; a greater total consumption of energy—although it is not clear exactly why this absolutely must be; greater electrolysis damage; larger investment in power plant; a shorter life of lamps, and an increased fire hazard. If the latter disadvantage is well established by experience, it might well be taken as the greatest objection of all.

Duplex Circuit Troubles—ADAMS.—*Telephone Journal, September 9.*

A metallic circuit is least likely to develop troubles if kept in its simplest form, being used for telephone signals and transmission only. When adapted for telegraph use also, or when equipped to form a part of a phantom circuit, changes in the condition of its own wires, or those involved in the telephone or telegraph circuits, may cause trouble on all. Variable resistance in one of the sides of a metallic circuit will cause cross talk between the phantom circuit and the imperfect actual circuit. Variation of resistance in one of the sides of a metallic circuit, used also for telegraph purposes, may cause the Morse signals to be heard in the telephones, and may cause the telegraph relays to chatter when ringing current is on the line. Partial or complete grounds will cause similar effects. Lightning arrestors are essential parts of such equipments. There is no great difficulty in transposing the two sides of an actual metallic circuit to prevent disturbances from other telephone circuits, and from the adjacent power lines. When a phantom telephone circuit is formed by a partial use of two complete metallic circuits, the same need of transposition exists, but the problem is more complicated because there are four wires to be handled, and an already existing transposition system to be maintained. One of the reasons why composite and phantom service frequently is condemned, is too weak an understanding of the requirements on the part of those maintaining the circuits and apparatus. Indeed, it is in some ways fortunate that duplex circuits require close attention, as the faults showing up more prominently in those circumstances ought really to have been cured in any case.

Iron Wire Ballast in Telephone Circuits—ENOCHS.—*Telephone Journal, September 2.*

An article of much interest on a new element for telephone circuits and apparatus. As is well known, carbon filaments in exhausted glass bulbs have two qualities, that of carrying considerable currents without destruction, and that of lowering resistance as the filaments are heated. This quality is a feature of the material and is the opposite of that existing in metals. A metal filament, therefore, sealed in a vacuum, will carry a considerable current without destruction, but the resistance will increase with the temperature. The author has so designed "lamps" of this kind as to enable them to be used in many places in telephone circuits where it is desired that the current automatically increase the resistance of the circuit. The earliest attempts to use lamps as signals in telephone lines placed them directly in the circuit. Because the proper lighting of a lamp requires that the currents it takes be kept within rather narrow limits, being enough to give a good signal and not enough to destroy the filament, the natural development has forced the lamps into the local circuits of relays, the windings of the latter being in the lines. By the use of the ballasts of Enochs, the line lamp, it is claimed, may be connected in the line in series with the ballast lamp, the lamp and battery voltage being such as to enable the lamp to light through the chosen line resistance. The signal lamp thus will still reach full but safe brilliancy on the shortest line, the resistance of the ballast filament running up to take care of the required extra potential drop. Similarly, ballast may be substituted for commoner forms of resistance in special toll trunks in which the object to be attained is the protection of the buttons of transmitters on short lines. In certain forms of circuits, contacts are required to be made during certain short intervals, which must not be too short or the necessary results will not follow. Much effort has been expended in producing such time element contact makers, and a use suggested for the ballast device is such a one. A relay operates on the making of a contact, and though the latter is maintained, the relay core is relatively slowly robbed of energy by the heating of the ballast. A fourth example is the insertion of such ballast as a limiting resistance in ringing leads to operators' keyboards. It is customary to use incandescent lamps for this purpose, and while they are the best form of resistance heretofore available, they have the fault that the resistance falls as the current increases. The ballast does just the opposite.

The Phenomena of Lightning—HARRISON.—*Telephone Journal, August 26.*

The second article of a series. A telephone system consists in general of two parts, these being the system of lines and the system of equipment. The equipment is damaged by lightning discharges, which are gathered by the lines. The rates of oscillation of lightning discharges depend upon the electrical qualities of the paths offered, and are relatively independent of the potential. Diagrams illustrate the relations between rates of oscillation and separation between arrestor parts. A table in the article shows the voltage required to cause a discharge between two metallic balls .04 of an inch in diameter when separated varying distances. The character of the surfaces of these balls is not stated, but the relation between separation and voltage is in reasonable accordance with the performance of gaps used in actual telephone protectors. The author recommends that telephone lines be protected from lightning strokes by erecting poles higher than those required for the line itself, and stretching a dummy wire from top to top of these poles, providing this wire with lightning arrestors.

NIGHT DIAL FOR AUTOMATICS.

Charles D. Reeve of the Grand Rapids (Mich.) Brass Company has invented an attachment for automatic telephones that will prove a blessing for many. It is a device to light the dial so the figures may be seen in a dark room on a dark day or at night.

Mr. Reeve began experimenting on the plan when the automatic was first put in service at Grand Rapids in January, 1904. The device was perfected some time ago and has been in use on several telephones in Grand Rapids for some months.

On the new automatic telephone the dial is made a little deeper than those at present in use, and in place of the figures being cast on the dial itself they are printed on a transparent film attached to the face of the dial. Behind this film is placed a small electric lamp, which is supplied with current from dry batteries or other source.

In one style the act of lifting the receiver from the hook closes the electrical circuit and lights the lamp, brilliantly illuminating the figures from behind. After operating the dial, pressing the call button extinguishes the light. In another style the lamp is lighted and extinguished by a separate button. Anyone who has occasion to use an automatic telephone at night will appreciate this improvement.

DEATH OF GUTHRIE GRAY.

The death of Guthrie Gray, at Muskoka Lake, on August 26, has cut short, at the early age of thirty-one years, the career of one whose future was full of promise. Mr. Gray was graduated from the Lawrence Scientific School of Harvard University in the class of 1896, and was an electrical engineer of more than ordinary ability. After his graduation he was for a number of years employed in the engineering department of the Buffalo General Electric Company, whose employ he left to accept a position under Henry Rustin, the superintending engineer in charge of the extensive lighting systems of the Pan-American and St. Louis expositions. For the past two years Mr. Gray has been employed in the engineering department of the National Battery Company of Buffalo, New York, and in the short time that he had been connected with this company his energetic work and cheerful disposition had gained him the high esteem of the management and his business associates. At the time of his death Mr. Gray was a member of the American Institute of Electrical Engineers.

Modern Telephony: Theory and Practice

W. H. RADCLIFFE

CHAPTER IX.

THE TRANSFER SWITCHBOARD.

THE transfer switchboard in a telephone exchange is composed of one or more units or sections; when composed of more than one unit the sections are adjoining, each being supervised by an operator whose duty consists in attending to the requests of the subscribers connected to her section. The equipment of each section in a transfer switchboard is primarily the same, and may be divided into two classes of circuits, called, respectively, the local circuits and the operator's circuits. Each of the former constitutes a part of a subscriber's local circuit and includes a magnetic line drop and a spring jack. By means of the line drop a subscriber may signal the operator, and by means of the jack the operator may complete the connections necessary to place the subscriber in communication with the party he desires.

In Fig. 24 a diagram of the local circuit on a transfer switchboard is shown. The subscriber's line, wires *a* and *e*, after connecting with the protective apparatus on the main distributing board *m*, continue on to the switchboard through what is termed switchboard cable. There are generally twenty-six pairs of No. 22 insulated copper conductors in one of these cables, each wire being tinned to prevent corrosion. Several layers of cotton thread saturated in paraffin bind the conductors together, and for an outer covering cotton braid is used. Owing to the terminals of each local circuit appearing but once in the face of the transfer switchboard no division of these wires is necessary, so that the intermediate distributing board is not required in connection with this type of switchboard.

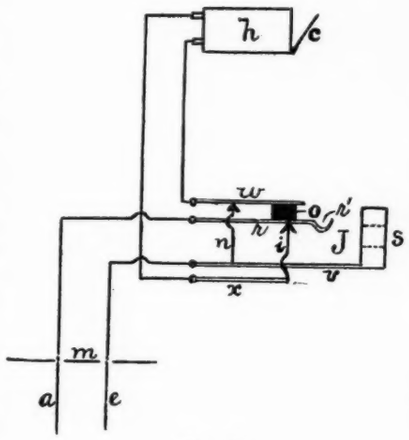


FIG. 24.

Upon reaching the switchboard the wires *a* and *e* are connected respectively to the springs *r* and *v*, the former spring being shaped into a hook at *r'* and the latter into a brass ring *s*. A block *o* of hard rubber holds the spring *r* to a spring *w*. By means of the contacts *n* and *i* the springs *v* and *r* are connected respectively to the springs *w* and *x*, and through them to a magnetic line drop *h*.

The drop *h* consists of two magnet coils wound to a resistance of about 80 ohms, and when provided with current they attract an armature which, in turn, permits the shutter *c* to fall. The number of the subscriber connected to wires *a* and *e* is painted on the face of the drop *h*, and when the shutter *c* falls this number is exposed to the view of the operator. In order that a subscriber may signal the operator in this system, it is necessary for him to turn the handle of his magneto-generator so that a current will be sent over the line to operate his line drop in the exchange switchboard. Each subscriber's circuit terminating at the switchboard in this manner provides a means whereby any one of them may signal the operator independently of the others.

A diagram of the operator's circuit on a transfer switchboard is given in Fig. 25. By means of the plugs *e v* and *r s*, known respectively as the answering plug and the calling plug, connections may be made between the subscriber's local circuits. Each of these plugs consists of a round brass tip attached to but insulated from a brass cylinder, and to each of these parts of the plug is attached one side of the operator's circuit, as shown in Fig. 25. Upon introducing one of these plugs, *e v* into part *J* or Fig. 24, called the jack, the brass cylinder or shank *v* of the plug comes in contact with the brass ring *s* of the jack, and the tip *e* of the plug striking against the hook *r'* of the jack lifts *r* from the contact *i*. The local circuit *a e*, Fig. 24, is thus connected to that part of the operator's circuit, Fig. 25, which is attached to the tip and shank of the plug *e v*, while the line drop *h*, Fig. 24, is cut out of circuit.

In the same manner the introduction of the plug *r s* into the jack of another subscriber's local circuit would make corresponding connections, and by tracing the circuit in Fig. 25 between these two plugs it is seen that the subscribers whose local circuits are thus connected would be in telephonic communication with each other. Having now explained the functions of the plugs, those of the ringing keys *k* and *l*, the listening key *f* and the clearing-out drop *c* will next be described. It may here be noted that all this apparatus is mounted within easy reach of the operator, who remains seated in front of the switchboard.

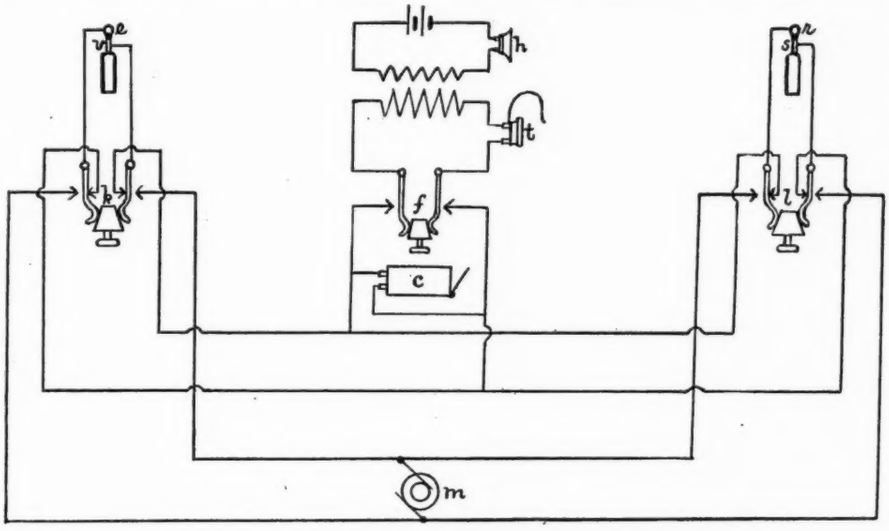


FIG. 25.

Taking the case of a subscriber desiring communication with another subscriber, the former party upon turning the handle of his magneto-generator would operate his line drop in the exchange switchboard, and the operator's atten-

Note.—This article is a continuation of the series which has been running in The Telephone Magazine.

tion being thus attracted would introduce her answering plug into the jack connected to his line. This action, as previously explained, connects in the operator's circuit, and at the same time automatically cuts out of circuit the low resistance line drop, which would otherwise shunt considerable of the talking current. The operator then closes the listening key *f* so as to connect her transmitter *h* and head receiver *t* in circuit, and thus learns from the calling subscriber the number of the party with whom he desires to speak. She then introduces the calling plug *r s* into the jack connected to the desired subscriber's local circuit, and by closing the ringing key *l* permits alternating current from a generator *m* to pass over his circuit and ring the magneto-bell at his instrument. Upon his removing the receiver from the hook he finds himself in direct communication with the party desiring to converse with him, as the operator in the meanwhile has again opened the ringing key *l*. After communication has been established between these two parties the operator opens the listening key *f* belonging to their connecting circuit and attends to other subscribers who may desire connections, in each case introducing for a time, by means of a listening key, her talking circuit into the connecting circuit employed.

Upon the completion of a conversation between subscribers they hang up their receivers and give the handles of their magneto-generators a few turns, which action produces currents for operating their clearing-out drop in the operator's circuit. One of these clearing-out drops is permanently bridged across each connecting circuit, as shown at *c* in Fig. 25, and consists essentially of a single magnet coil wound upon an iron core; when the coil is supplied with current the clearing-out drop operates in a similar manner to the line drop already described. The movement of the shutter on a clearing-out drop notifies the operator that that conversation is completed and she, therefore, removes the answering and calling plugs from the jacks on those subscribers' lines. As the clearing-out drops are in circuit whenever their corresponding connecting circuits are in use they must be wound to a high resistance, usually 500 ohms, so as not to shunt much of the talking currents. Since a number of them may be in use simultaneously in separate circuits, and as these coils are mounted side by side in the switchboard, it is necessary that each be enclosed in an iron case so as to prevent the current in one coil inducing a current in an adjacent coil, and thus causing cross talk.

Transfer switchboards usually accommodate in each section from one hundred to one hundred and sixty subscribers' lines, the two conductors of each line terminating, as previously stated, in a jack located in the face of the board. Above these jacks are their corresponding line drops, and for the convenience of the operator the drop and jack of a circuit are given the same number, the number assigned in each case being that of the subscriber connected to the circuit. The operator's transmitter may be either suspended conveniently near by flexible wire cords from a projecting arm at the top of the board, or else mounted upon a breast-plate, which is held in position by a strap around the operator's shoulders. The latter method represents more advanced practice, as the transmitter then follows each movement of the body and is always in the proper position; this results in a considerable saving of time. The operator's head receiver, also connected by flexible wire cords, is worn constantly over her ear. Below the line drops and across the face of the board are mounted the clearing-out drops. There are from ten to seventeen of these and, of course, a corresponding number of listening keys, the latter of which are placed on the keyboard. The answering and calling plugs for each of the ten or more connecting circuits are located on a shelf, the one behind the other in ten or more rows, respectively. The plugs are connected by pairs of flexible wire cords to the ringing keys, the latter of which are also placed in pairs on the keyboard in front of their corresponding plugs. The keyboard should be hinged so that it can be raised, if necessary, to afford access to the wiring and apparatus mounted thereon.

It is necessary that the flexible wire cords connecting the plugs and keys be of considerable length, so as to allow the plugs to be introduced in any one of the jacks on the switchboard section. To prevent these cords from becoming tangled while the plugs are being used, weights are employed. Each weight carries at its top a pulley through which one of the wire cords is passed, so that whatever the position of the plugs their connecting cords are always taut and do not, therefore, interfere with each other.

(To be continued.)

ALBANY HOME TELEPHONE COMPANY.

Three years ago, when the Home Telephone of Albany, New York, came before the people of Albany with a proposition and request for a franchise, there was a strenuous objection. Of course, rival companies took advantage of this and helped matters along for themselves, but the company produced positive proof that it could do the work, and after a short time it received its franchise and began. In a very few weeks after the installation of its system the general public began to notice a difference for the better, and the Home company leaped into popular favor. It fairly outgrew itself, and the efficient and prompt service brought the company into constant demand. At the present day it is one of the most satisfactory telephones in use anywhere, and its steady growth demonstrates what it is to have a good management. The business rate of $48 and the residence rate of $24 has solved the problem for the people of Albany, and it is not to be wondered at that the company is now occupying a beautiful three-story building of its own, employs about one hundred men and women, and has one of the finest switchboards made, capable of serving 7,200 separate subscribers. Each subscriber has a separate line or circuit to the central office, thus doing away with party line service. By connections with the other home companies in adjoining cities and towns, the subscribers have the same benefits as those of any other company, with reduced rates, a better service, and many other incidental features which have contributed to the success of this company.

The officers and directorate of this company is composed of a most representative set of men. Hon. Howard Hendrickson, now city recorder, is the president. He has been largely instrumental in bringing the company to its present high standing, and his connection with it is sufficient endorsement of its stability. He is one of the most prominent lawyers in the city, and is identified with many important commercial and business interests.

Vice-president Irving H. Griswold has been in the telephone business for many years, and is one of the most energetic men connected with the management of the company.

The general manager, H. M. Keys, is one of the most experienced men in the business. He has had a long and valuable training, and is well adapted to meet the requirements of his position. He is a graduate of the Technical Institute of Boston, and it was there he began to study telephony. After his graduation he went with the Bell company, at Philadelphia, as assistant engineer on specifications, and remained for two years, after which time he went with the Keystone company. When the Albany Home Telephone Company was formed he joined it.

The treasurer, George C. Lee, Jr., has been identified with business interests of Albany for a number of years, and the secretary, H. J. Prince, Jr., has taken a prominent part in advancing the interests of his city.

The Telephone in Foreign Countries

INTERESTING MEETING OF SOUTHERN TELEPHONE SOCIETY.

RECENTLY at Gresham Hall, Brixton, S. W., a highly interesting and valuable treatise on "Telephone Operating," was given by C. W. Piggott, manager of the Hop Exchange, London Southern District. It was one of the usual meetings of the Southern Telephone Society (evenings devoted to the culture and advancement of telephony), to which lady operators from various exchanges had been invited and showed their manifest attention and interest in the proceedings by being present in considerable force. About 120 sat down to hear Mr. Piggott's paper on "Operating," among whom were to be seen L. Harvey Lowe, service manager; G. Greenham, Metropolitan maintenance manager; H. Davis, who for over ten years has been district manager of the National Telephone Company's Southern District; and many representatives from the Hop, Brixton, Battersea, Gerrard, Holborn, London Wall, and Deptford Exchanges, besides a host of other old friends of Mr. Piggott's. There were numerous illustrations by oxy-hydrogen lantern, charts and diagrams.

The following subjects were touched upon by Mr. Piggott: Some Earlier Exchanges; Coleman Street; Heddon Street; Mincing Lane; Leadenhall; Hop; Chancery Lane; Edison Peg Boards; Bell Boards, leading up to the later boards fitted with cut-out jacks; Branching Boards; Flat Boards; Monitor Positions; Docket System of Registering Faults and Complaints; Management of an Exchange; Essentials to Good Operating; Good Operators.

It was apparent from the start that Mr. Piggott, who had been in the service of the National Telephone Company twenty-one years, had devoted great energy, labor and time to preparing his paper. Judging from the earnest and rapt attention of his audience, it was plainly seen that his studiously careful discourse struck home, for among those present were the better element of operators, clerks-in-charge, supervisors, electricians, engineers, inspectors and others—people who could thoroughly understand and thereby appreciate the subject at issue. At times there was a vein of genial good humor portrayed, which met with instant recognition and hearty applause.

In these days of frequent readings, lectures, meetings, etc., there is generally so much noise prevailing as to spoil the pleasure and interest of many; but upon this especial occasion, everyone seemed to be deeply fascinated and impressed with the speaker's clear and careful enunciation, at once telling and to the point—the highest compliment that can be paid any speaker. The production of many of the views had been a trying ordeal, as they had to be photographed from old ink sketches; but on the whole they were remarkably good and created a genuine surprise.

The Southern Telephone Society was formed two years ago as an organization for gathering the technical staff of the National Telephone Company together for the purpose of comparing notes and discussing any problems as to their work. It was entirely voluntary. Many instances of the knowledge and ability of various members were to be seen in the numerous diagrams, done on brown paper with various colored chalks, with which the walls of the hall were covered.

H. Davis had been the worthy president of the Society up to the time of the company's reorganization, in January, 1905. G. Greenham, the existing president of the Society, presided at this meeting.

At the close of Mr. Piggott's paper, L. Harvey Lowe made a few remarks in praise of the speaker and his address, and to make a comparison on the subject of traffic cited the railway company's method of transport, as against the conveying of messages, etc., over wires, which became the telephone's traffic. His words were attentively listened to and his humor appreciated.

The worthy and genial chairman, G. Greenham, proposed a hearty vote of thanks to Mr. Piggott, for his ability, wonderful memory and great patience in bringing out such minute details, and for the success of his paper. This sentiment was most heartily and vociferously applauded and the meeting was brought to a successful close.

* * *

A SAFETY DEVICE FOR TELEPHONE LINES.

A device which is thought to overcome the disadvantages of the heating coil used to protect telephone apparatus has been invented by M. Van Deth, and is described in L'Industrie Electrique (Paris). The apparatus consists of a small electromagnet of a plunger form, which is connected in series with the line. When an excessive current passes through the line the magnet lifts the plunger, striking a detent, and thus releasing the spring of a contact, which opens the circuit. The plunger then returns to its original position and a pressure of the finger on a projecting knob resets the device. The advantages of this over the heating coil are the smaller resistance, the instantaneous opening of the circuit, the easy resetting of the device, and the inductance of the coil, which assists the lightning arrester in its operation.

* * *

THE SHAH AT THE TELEPHONE.

The Shah of Persia, who recently visited France, had a trifling misadventure on arriving in that country. His majesty expressed a wish to test the telephone, and, opening the address book at random, rang up a wealthy lacemaker at Mirecourt, some miles from Contrexeville. The conversation was as follows: "Are you there? What sort of weather are you having in Mirecourt?" "What the dickens is that to you? Is that all you rang me up for?" "My dear sir, don't suppose I desire to bother you. But the fact is, I am the Shah of Persia!" "Oh, are you, indeed! Tell that to another, and do me the favor of leaving me to my business, and go caterwauling elsewhere." Whereupon the connection was cut off. Unluckily, his majesty is acquainted with French enough to know that "chat" means cat, and is pronounced exactly like Shah.

* * *

CORRECT TIME BY TELEPHONE.

While time signals have been distributed by telegraph for many years and also by wireless telegraphy more recently, it is only lately that use has been made of the telephone for this purpose. The idea was put into practical application in France, where, at the request of the Chambre Syndicale de l'Horologie of Paris, experiments were made by the observatory of the Bureau des Longitudes. The work was so successful in the trials made in Paris, that it was decided to extend it to the whole French telephone system. As the object is to transmit the signals with considerable exactness a verbal signal would not answer, so a microphone was arranged whereby each beat of the pendulum of a standard clock in the observatory could be heard in the receiver. By

a prearranged system of omitting a certain number of beats, or other arrangement of the signals, it is possible to identify a given signal as true noon. The method is not only most useful for watchmakers and regulators of chronometers, nearly all of whom enjoy telephone service, but for navigators, who by simply having telephone connection either at the wharf or at an anchorage buoy can regulate their chronometers while in port by an observatory standard. This was done in the case of a French warship at Brest with an accuracy of between .1 and .2 of a second. As it is perfectly feasible to connect any telephone circuit in this way there is no reason why the system should not be widely used.

* * *

POPE PIUS AN ARDENT USER OF THE TELEPHONE.

A dispatch from Rome says that of late Pius X. has become a constant user of the telephone. In fact, all his personal communications on important business with every diocese of Italy are transmitted from the Vatican over the wire. Since he sent his blessing to his beloved Venetian diocese last year Pius X. has become fully aware of the importance of the telephone for the speedy transaction of business and has come to the conclusion that he would hereafter save much of the red tape and delay of the Roman congregations by attending to some of the church business personally at the telephone. Inquiries at the Vatican telephone exchange revealed the fact that the most frequent use of the long-distance telephone made by Pius X. is for communication with Venice, in which city he holds long conversations not only with his successor, the patriarch, but with some of his relatives and the numerous friends he made during the time he was the patriarch.

* * *

CALLS LONDON TELEPHONE SERVICE ATROCIOUS.

It hardly required Postmaster W. R. Wilcox of New York, who is visiting Europe to study methods of dealing with the post, to tell Londoners that their telephone service is as bad as it possibly could be. "Your telephone service in London is the worst I ever saw in any place," said Mr. Willcox. "There's not a small town in America, which has not far better service. To put it mildly, the service here is atrocious. I tried to use the telephone for a time, but as it usually took about fifteen minutes to get an answer I have entirely abandoned the service during my stay here."

There is not a Londoner who can say a good word for the telephone service, but perhaps, judging from the discussion in the house of commons the other day, there will be an improvement some time after the year 1911, when the license of the National Telephone Company comes to an end and control of the telephones becomes a state affair. The postmaster-general has authority to buy up all municipal telephone companies that wish to sell, and certainly the government is determined that no more new municipal licenses will be granted throughout the kingdom.

* * *

THE TELEPHONE IN CANADA.

The Canadian Parliamentary Telephone Committee recently heard the evidence of A. L. Tétu of Nashville, Tennessee, secretary of the National-Interstate Telephone Association. He testified as to the competition between the Independent and Bell systems. He did not think the time had come for government ownership of telephones and telegraphs, but did think the government should impose restrictions in franchises forbidding competing companies to sell out to one another. A local system with antiquated equipment should bring its apparatus up-to-date before being admitted to a long-distance service. He knew of any number of cases where farmers enjoyed telephone service at $15 a year. In a city of 20,000 a fair rate would be $30 for business and $18 for residence. J. B. Ware also testified as to Independent conditions in Michigan. He believed in government ownership of long-distance lines, but not of local exchanges.

The Parliamentary Committee appointed to inquire into the telephone system of Canada has concluded its sittings, and has reported that evidence has been taken, but that it is too late this session to make any recommendation in the direction of government control or ownership. This subject is left over until next year.

The Nova Scotia Telephone Company is arranging to extend its underground conduit system in Halifax, in order to meet the objections to the pole lines.

At the annual meeting of the New Brunswick Telephone Company, held in Fredericton, it was decided to erect a number of lines during the present season, including a line from Chatham to Dalhousie, connecting with Bathhurst, Campbellton and other places along the North Shore; also a line from Canterbury to McAdam, another from St. Stephen to Moore's Mills, and one from Lepreau to Musquash. The company also decided to connect with the Kamaraska Telephone Company, by extending the line to Edmundson. A $6,000 brick building will be erected in Fredericton for the use of the company's head offices.

An American company has purchased the local telephone plant at Moose Jaw, N. W. T., and will immediately begin to enlarge the plant. It is proposed to make connections with the surrounding districts.

The Temiskaming Telephone Company, Limited, has been incorporated to construct and operate telephone lines in the district of Nipissing, Ontario. The head office of the company is to be at New Liskeard and the capital stock is $25,000.

* * *

TELEPHONY IN MEXICO.

A telephone line is being constructed from Soledad to Huatusco, State of Vera Cruz. It will afford communication for a number of ranches with these towns.

A new telephone system is to be installed in the city of Celaya by a syndicate of capitalists who have obtained a concession from the state government for the purpose.

Antonio Calero has obtained a concession from the government of the state of Chihuahua for the construction of a new telephone system for Santa Rosalia.

Miguel Enriquez and Damon Sanz have obtained a concession from the government of the state of Chihuahua to build and operate a telephone line between Minaca and Guerero.

Governor Enrique Creel, of the state of Chihuahua, has granted a concession for the construction and operation of an extensive system of telephone lines in the central part of the state.

La Compania Noruega Mexicana, with headquarters in the City of Mexico, has obtained a concession to establish systems of telephones throughout the state. Christian Schjetnan is manager of the company.

Oton Sartorius, general manager of the Mexican General Supply Company of the city of Chihuahua, has obtained a concession from the state government for the construction and operation of a new telephone system in Chihuahua. He contemplates building long-distance lines to Parral and Jiminez.

The new telephone line which was recently completed between San Luis Potosi and Villa de Armadillo has been placed in operation. The inauguration of the line was made an event of much ceremony, the governor of the state, Jose Maria Espinoza y Cuevas, being present. It is said to be one of the best constructed lines in Mexico.

A telephone line is to be constructed from Compostela. territory of Tepic, to El Rosario, state of Sinaloa. The line is to be built under direction of the government of the territory of Tepic. It will be used principally for the dispatch

of public business relating to affairs of the territorial government.

The government of the state of Sonora has granted a concession to E. W. Bristol for the construction and operation of a telephone line from Hermosillo, the capital, to La Colorado. The property and money invested in the enterprise are exempt from all state taxation for a term of years.

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TELEPHONE NOTES FROM ABROAD.

Recently in London a telephone cable fell upon the live rail in the underground railway, causing fires to burst out in two exchanges.

Sheerness, England, though an important naval station and a town of more than 15,000 inhabitants, does not possess a single telephone.

A dispatch from Vienna, Austria, states that automatic telephones have just been introduced among a limited number of subscribers in that city.

A. R. Bennett has been retained to continue to act as consulting engineer to the municipal telephone department of Brighton, England, at a fee of £75 per annum.

On the continent of Europe the longest telephone line is 742 miles in length and runs between Berlin and Paris. Then follow Berlin and Buda-Pesth, 612 miles; Berlin and Memel, 593 miles; Berlin and Basel, 377 miles.

The Philippine Telephone Company, a two-million-dollar corporation that is to apply for a franchise to operate a local and long-distance telephone system in Manila, has been incorporated under the laws of Nevada. It is composed of California capitalists, who took advantage of the mild Nevada corporation laws.

Havana is to have a new 15,000-line telephone system which is to replace the old Red Telefonica system, formerly owned by a Spanish company, but now a part of the Cuba Telephone & Telegraph Company. A system will also be installed at Marianao, a suburb of Havana. The officers of the Cuban Telephone & Telegraph Company are as follows: President, Roland R. Conklin; vice-president, S. L. Jarvis; general manager, W. M. Talbott.

The secret wireless telephone of A. T. M. Johnson, a retired Australian official, depends upon steel reeds tuned in unison or octave to the voice of the person speaking, and, as voices vary greatly, a special reed is necessary for each person. On speaking into an ordinary microphone, a large Ruhmkorff coil in circuit transmits the vibrations, without connecting wire, to the receiving apparatus. Messages have been sent to distances of half a mile. Secret telegrams can be sent through similar tuned steel reeds, and these are received by a secret bell arranged to respond only to the vibrations from the proper transmitter.

UNIQUE CODE FOR TELEPHONE.

Notwithstanding the perfection of the modern telephone those who have occasion to use it daily will agree that that sort of communication is often perplexing and confusing, especially in respect to long-distance lines. When the telephone machinery is in good order, the weather perfect and the persons at either end of the wire have their mouths exactly at the right place with reference to the transmitter, everything moves perfectly, but this happy combination does not always occur and the time conditions are most troublesome is when the message is most important. Particularly confusing is the transmission of proper names, and especially the initials. If one gives the initial F and there is anything at all out of order or carelessly done it is sure to sound like S and vice versa. If one uses the letter T it will surely be taken for the letter P, G. D. or C. These are only two instances. There are many others.

Few people have occasion to use a telephone more than telegraph operators, especially where their offices work in conjunction with long-distance offices. Operators, therefore, noticed long ago the facts related above and one operator at least has devised a "code" which he is trying to get his friends and everybody else to use for the mutual convenience of all and in the interest of accuracy in the transaction of business. By his system also code messages may be the more safely transmitted over a telephone wire for the reason that a code message as it appears to one not knowing its meaning is unintelligible and there is no way of knowing that it is accurately taken unless the hearing is absolutely distinct.

The operator who has devised this telephone code is J. H. Bailey, manager of the Western Union office at Prescott, Ohio. Other codes might be devised in the same way by using other names, but it is desirable that his code be adopted generally, as it is now in use by some and it has been carefully studied out, using words easy to pronounce and yet dissimilar. It is as good as any and its value lies in its universal adoption. The following is Mr. Bailey's code, the use of which will be hereafter explained, and it is suggested that the code be clipped out and pasted in the hat:

Arthur	John	Robert
Benjamin	Klondike	Samuel
Charlie	Lady	Thomas
David	Mary	Underwood
Edward	Nancy	Violet
Frank	Oliver	William
George	Paul	(X) for Cross Road
Henry	Queen	Yellow Dog
Isabel		Zebra.

In ordinary use suppose the telephone message came: "D. S. Brown was killed." If the victim were not a well known character his initials nine times out of ten would be incorrectly received. D would sound like either E, C, B, or some other letter, and S would be sure to sound like F, so the name would most likely appear C. F. Brown instead of D. S. Brown. In the use of the code when the transmitter gave the name the receiver would immediately inquire in an interrogatory tone, "D for David and S for Samuel?" If the answer came in the affirmative he would know the initials were D. S. But if the transmitter were not aware of the method of using the code he would immediately reply, "I don't know what the initials stand for," and that method of talking would be all off. But if everybody knew that code and used it it would be simple enough. It would not matter whether the dead man's name was Douglas or Deuteronomy in giving the initials the phrase "D for David," would make it clear to the receiver that the first initial was D, and so on through the conversation. Whenever a doubt arose about the clearness of a word its first letter could be accurately learned by the code. If the missing word was "make" and the receiver thought it was "take" he would inquire, "Is the first letter Thomas or Mary?" and the transmitter of course would say "Mary." Or he could spell the word out by saying "Mary, Arthur, Klondike, Edward," the first letters of each name forming the word "make."

Or if he desired to write a code message that could not be mistaken, knowing that his correspondent understood the code, and if what he desired to say was, "Come at once," he would send this message, "Charles Oliver Mary Edward, Arthur Thomas, Oliver Nancy Charlie Edward." The first letters of each name would spell the three words. The system is not recommended so much for the use of it as a code, for there are briefer codes for those who need them. But it is valuable for the man at the telephone in getting the correct words used by a stranger in a code of his own. And its main virtue is in locating missing words and confusing initials in ordinary daily conversation over the telephone.

Decisions Affecting Telephony

G. W. HAND

ADDITIONAL SERVITUDE IN WEST VIRGINIA—WORD "COMPANIES" IN A STATUTE INCLUDES INDIVIDUALS.

The following language is used in the public acts of the above state (chapter 96, page 297): "Telephone companies desiring to extend lines of telephone in this state may place poles for wires along the county road by and with the consent of the county court of the county through which such lines may pass." F. P. Lowther in his lifetime complied with all the provisions of the law and had begun the erection of a telephone line in Wetzel county. At his death his heirs went on with the construction and had in the progress of the work reached the permises of one Bridgeman, who refused to allow the company to proceed. An injunction was thereupon secured restraining Bridgeman from interfering with the business of building the line. Two questions were raised by the defendant who appealed to the Supreme Court of Appeals from an order of the lower court making the injunction permanent. It was urged that the word "companies" in the law applied only to corporations and that Lowther's authority to build a telephone line was therefore void. The Court of Appeals said regarding this claim:

"It may be argued that it is the policy of the law in West Virginia, under this and other statutes, to grant such franchises only to corporations, in order that the performance of a public duty may be better required. The performance of a public duty may be compelled when the business is conducted by an individual as fully as when it is conducted by a corporation. . . . The public duty springs not alone from contract, but it is the result of the character of the business and the laws regulating it. The business is subject to constitutional and legislative control and lawful police regulation. The public duty does not arise from any question of ownership, but from the nature and character of the business, and the fact that it is conducted under a franchise granted by public authority. It is not claimed that there is any authority under this act to consent to the erection of poles and wires for private use along a public highway either by a corporation or an individual. No question of the right of eminent domain is involved in this case. The question arising is whether an individual can, under the act mentioned, hold a franchise to construct a telephone for public use along a public highway. Did the legislature intend to restrict the conducting of the business of operating a telephone for public use to a corporation, and exclude individuals from this class of legitimate business? Unless there be some constitutional or legislative restriction, then the business being legitimate, would be open to all persons alike. . . . The county court had authority under the act above referred to to consent to this franchise for the placing of telephone poles and wires for a telephone for public use along a county road to F. P. Lowther, an individual."

On the question of additional servitude the court said in quoting from the case of Maxwell v. Telegraph Company, 41 S. E. 125, as follows:

"Telephone poles are not things of beauty, yet their utility is so great that their ugliness must be endured until human invention has discovered some more tasteful substitute for them. The public can well afford to surrender a reasonable portion of the public easement in its highways to a public utility of such vastly increasing importance. As the owner of the fee in such highway loses nothing thereby, he has no grounds to complain. It puts no additional burden on the fee, but it is a burden alone upon the permanent easement to which it is appurtenant and subservient."

It was further said that this case was binding authority and established the rule in the state of West Virginia to be that there is no individual servitude by the reasonable use of a public highway for the purpose of placing telephone poles and wires thereon; that while some courts make a distinction in this matter between city and rural highways there is no sound reason for the distinction.

Lowther v. Bridgeman, 50 S. E. 410.

AUTHORITY TO REGULATE RATES OF SERVICE IN OHIO MUST COME FROM THE LEGISLATURE.

A discussion of this very important proposition by the highest court of the above state was the result of an appeal from an affirmative decision by the circuit court of Columbiana county in a suit by certain parties to compel the Columbiana County Telephone Company to continue furnishing telephone service to the patrons of the company at the rates determined in an ordinance granted the predecessor of the above company. This ordinance provided in part as follows:

"Be it further ordained that the said S. C. Thayer, his associates, succcessors and assigns, be and they are hereby limited in the price to be charged for exchange service in the corporate limits of said city of Salem, under the powers herein granted, as follows, to-wit: The exchange for residence service shall not exceed eighteen dollars per annum, payable quarterly in advance; and the charge for business service shall not exceed twenty-four dollars per annum, payable quarterly in advance."

"Be it further ordained, that the said S. C. Thayer, his associates, successors and assigns, under the powers granted herein, shall erect a line and furnish telephone service to any person residing within the corporate limits of the city, who shall desire to become a subscriber thereto and at the price hereinbefore mentioned."

July 1, 1903, Hyman & Getz of Salem applied under the above rates for telephone connection with the company's exchange. This application was refused and an injunction proceeding was commenced to compel the company to comply with the terms of the ordinance granted to its predecessor. The company also declared its intention to remove the instruments of those already installed under the old rate unless the renters should pay an increased rate.

Was the contract for specified rates granted to the predecessor of the Columbiana company within the power of the council to make and therefore binding on it? We quote the following sections (3461, 3471) from the general laws of Ohio:

"When any lands authorized to be appropriated to the use of a company are subject to the easement of a street, alley, public way or other public use, within the limits of any city or village, the mode of use shall be such as shall be argued upon between the municipal authorities of the city or village and the company; and if they cannot agree or the municipal authorities unreasonably delay to enter into any agreement, the probate court of the county, in a proceeding instituted for the purpose, shall direct in what mode such telegraph line shall be constructed . . . so as not to discommode the public in the use of the same; but nothing in this section shall be construed as to authorize any municipal corporation to demand or receive any compensation for the use of a street beyond what may be necessary to restore the pavement to its former state of usefulness."

"The provisions of this chapter shall also apply to any company organized to construct any line or lines of telephone; and every such company shall have the same power and be subject to the same restrictions, as are herein prescribed for magnetic telegraph companies."

It was said in the case of City of Findley v. Home Telephone Company, 72 N. E. 1156, that a telephone company gets its right to go upon the streets with its poles, wires and other appliances from the state, referring to the sections of the state law above quoted, and that the power of the municipal authorities in the premises is to agree upon, not the right to use but the mode of use of such public ways; in short, the right of the public to the free use of the streets is to be maintained and the general duty of the municipal authorities to keep the streets free from nuisance is to be performed. Relying on the authority of this case the Supreme Court held that the council had no authority to make an effective arrangement as to rates and that the principal question in the case should be decided against the contention of the plaintiffs.

Was the company estopped from raising its rates owing to the alleged benefits which the city had conferred on the company as a result of its agreement to charge certain specified rates? The court said that the company was not so estopped. The following very plain language seems to state the law on this question more explicitly than has heretofore been noticed:

"Its (the city's) plain and only duty was to insist upon and secure a mode of use entirely consistent with the beneficial use by the public at large of the streets and alleys of the municipality. It had no authority to consent to an arrangement more inconvenient to the public in order to get gain to itself or anybody else. It had no right, upon any consideration whatever, to incommode the public in the use of the streets. Any attempt to gain advantage for itself by free service or otherwise or to such portion of the public as might want to avail itself of the telephone service, was manifestly against the letter as well as the spirit of the statute, and cannot in law or in equity constitute a predicate for an estoppel. It asks to stand upon its own illegal contract, and asks a court of equity to decree special performance, by injunction, of a contract which admittedly it had no power to make, and which the statute forbids."

Farmer & Getz v. Columbiana County Telephone Company, 74 N. E. 1078.

FORFEITURE OF CHARTER—PURCHASE OF COMPETING COMPANIES.

About the year 1883 the Cumberland Telephone & Telegraph Company, a corporation organized under the laws of the state of Kentucky, having received proper authority, engaged in a general telephone business in the state of Tennessee. The rates fixed by this company were in the opinion of many citizens of the state exorbitant. To force a reduction of the alleged unwarranted high rates of service several citizens of the city of Columbia organized what was called the "City Telephone Company." After a time the rates charged by the new company, due to the immediate reduction by the old one, thus limiting development of the new company's business, were found insufficient to pay expenses and accordingly assessments were made to keep the new company in operation. It became at once a strife between the new company and the Cumberland company for supremacy in the telephone business of that city. Finally suit was commenced in the name of the state to oust the old company from the state on several grounds upon which it was asked that the charter be declared forfeited.

The Supreme Court of the state had decided the controversy and in the opinion some very important law is declared involving the respective rights of parties in controversies of this nature. First, upon what grounds will the charter of a public service corporation be declared forfeited? It is the rule that if a corporation is found guilty of persistent misconduct or violation of any statutory duty that its charter will be taken away. Without referring to the specific violations alleged to have been committed by the Cumberland company, we quote certain statements from the opinion, which disclose what acts will work a forfeiture:

"It must be borne in mind that specific acts which have been held sufficient to warrant a forfeiture . . . may be so modified by extraneous facts as to deprive the former of value as a guide to a correct decision. The most important, if not the only interest to be guarded is the public interest. Especially do these observations apply where the proceedings are based upon misuser or nonuser of franchises. It may be considered well settled that not every misuser which may be detected will justify a forfeiture, but only those constituting a prejudice to some public interest, or which, being persisted in, will involve the safety, welfare or security of the community."

The above statement of the law was followed by the following quotation from an authority on the subject who, by the way, was the authority for the previous observations:

"The court will refuse a forfeiture, though the corporation is guilty of a misuser where it appears that no injury has resulted to the public. . . . Courts have a discretion to enter or refuse a judgment of forfeiture accordingly as the public injury appears serious or trivial. The general rule is that to warrant a forfeiture of corporation franchises for misuser, the misuser must be such as to work or threaten a substantial injury to the public." The court further said: "We think not only has the court discretion to look to the public weal in refusing or granting a judgment of forfeiture when invoked against a corporation, but it will not be awarded unless the act complained of has been a wrongful or willful abuse of corporate rights or duties."

On the subject of the forfeiture of the Cumberland company's charter as a result of the fierce competitive rate war which the latter corporation had waged against two smaller companies in the state to the great injury of the latter, the court:

"We know of no law which will protect the weak against the strong in the war of rates. The inevitable result of such strife, if long continued, must be that the former will be compelled to yield to the ampler capital of the latter. This occurred in the two cases referred to. Realizing as these weaker corporations must have done, that the utter destruction of all their interests would follow continued conflict, they sold out their properties to the defendant company. . . . That the purchase was made by the stronger company to end a ruinous war of rates and avoid further competition in these particular localities did not make the acquisition of these properties any the less legal."

It is evident from the foregoing that the legality of forced consolidation so often resorted to by the powerful telephone combinations throughout the country to shut out the smaller competing companies can hardly be questioned so long as the result of such combination is not detrimental to the general public welfare.

State v. Cumberland Telephone & Telegraph Company, 86 S. W. 390.

AUTHORITY OF TELEPHONE COMPANY TO DO ELECTRIC LIGHTING BUSINESS.

The general laws of 1888, article 23, class 11, section 24, of Maryland, provide for the formation of telephone companies and for the transaction of any business in which electricity may be applied. The acts of 1892, page 662, chapter 469, enact that a certain corporation employing electricity, and to that end it should have in Baltimore City all the privileges mentioned in the general laws of 1888, article 23, section 111. This section provides for doing business by electric light companies, except in Baltimore city. Section 254, however, provides that any corporation organized

under section 24 above referred to shall obtain a special grant from the assembly and the approval of the city council of Baltimore before using the streets. The Court of Appeals of Maryland has held in a suit in which the above facts existed that the corporation in question having obtained the city's consent, had the right to conduct an electric lighting business in the city of Baltimore.

Brown v. Maryland Telephone & Telegraph Company, 61 Atlantic, 338.

MEASURE OF DAMAGES IN TEXAS.

In a railroad case in the above state recently decided the question was what was the measure of damages which a property owner could demand as a result of the inconvenience and damage to his property as a result of a railroad being placed in front of his property. A constitutional provision of Texas says that no property shall be taken for public use without adequate compensation being made therefor. On this authority suit was instituted to obtain damages for the depreciation of the value of the property and in deciding the case of Court of Civil Appeals said: "We are of the opinion that the insertion of the word 'damaged' in the constitution was made in order that persons suffering damage from the lawful construction and operation of public or quasi public works might have their action for damages though the acts complained of might not come within the definition of the word 'taken'. . . . The right to sue for damages for the injury suffered was the right conferred. . . . For damage suffered compensation is allowed though the property be not taken." And further, "In actions of this sort the measure of damages is the depreciation in the market value of the property. The things which affect this value are what the company has lawfully done and which within its corporate powers and duties it may be expected to do."

The court also discussed the question of the right of a property owner to make successive demands for the continued injury which he alleged and said that the damages must be confined to one suit and that any improvements or change necessarily made by the company would not subject it to additional liability for damages.

The law above declared is plainly applicable to telephone companies which being quasi public corporations and utilities would in this regard stand on the same footing with railroads.

Settegast v. Houston, O. L. & M. P. Ry. Co., 87 S. W. 197.

"PUBLIC ROADS" INCLUDES CITY STREETS IN IOWA.

The laws of 1873 of the above state provided that any person or company had the right to construct a telegraph or telephone line along any of the public highways of the state. Under this authority the Nebraska Telephone Company erected certain lines of telephone in the city of Council Bluffs. In 1897 the code changed the phrase "public highways" to "public roads." A suit was recently brought against this company to oust it from the above city. It was contended that the company had no authority to erect lines on city streets after the code of 1897; that while it was conceded that the lines erected under the law of 1873 were lawfully erected that the company could not develop its system along city streets except by special authority from the city interested; that the change from "public highways" to "public roads" was intended by the legislature to deny the right of telephone companies to erect lines with the special authority referred to. The Supreme Court disposed of the argument that the legislature intended to deny companies rights along city streets by leaving it unanswered, saying, "Whether the change was intended to distinguish between streets and rural ways, we need not determine, for, whatever the intent as to that, it is apparent that the change was not intended to, and does not, limit or affect the rights of those who accepted and acted upon the grant given by the former statutes."

An interesting legal point was also passed on in the decision. The suit was by quo warranto proceedings and the court said that where it is not claimed that a city did not have power to pass an ordinance granting a telephone company the right to use its streets, the ordinance will not be declared void in such a proceeding.

State v. Nebraska Telephone Company, 103 N. W. 120.

INJURY FROM FALLING OVER PILE OF STONES PLACED ON SIDEWALK.

A judgment obtained in the Common Pleas Court of Philadelphia county, Pennsylvania, against the Keystone Telephone Company has been affirmed by the Supreme Court of the state. The company appealed from the lower court on the ground that the plaintiff had failed to connect the fact of the company's workmen, in lawfully removing certain stones in digging a conduit, with their being placed in the alleged position which caused the injury. The court said that the circumstances reasonably led to the conclusion that the stones were piled in the particular place by defendant's workmen; that these circumstances excluded any other conclusion equally reasonable and that a case was made for the jury with whose judgment there was no authority to interfere.

White v. Keystone Telephone Company, 60 Atlantic 998.

WIRELESS TELEPHONY MAY BE MADE PRACTICAL.

The problem of making wireless telephones practical may be solved by Swissvale men and some new points in wireless telegraphy discovered, as well, says the Pittsburg Post. Experiments with both wireless telegraphy and wireless telephony are to be started in that borough within the next two weeks by Thomas F. Jack, an electrical engineer, and Dr. O. T. Cruikshank, who has been a close student of electricity for many years. As soon as the apparatus can be placed in position both the men will begin working out improvements on the present systems of wireless telegraphy and telephony.

The wireless telegraph will be tested thoroughly first and then the telephone will be taken up. Mr. Jack has been working for several years on a system of wireless telephony and believes that he has it about perfected. Every moment he can spare from his work as designer of switchboards for the Westinghouse company is spent at his wireless telephone and with the assistance of Dr. Cruikshank he hopes to overcome the difficulties he has experienced and perfect his system.

Instruments and all the necessary apparatus for testing both the telegraph and telephone instruments have been constructed by Mr. Jack and work has been started in placing them in position.

Mr. Jack resides on the top of a hill, about an eighth of a mile from Dr. Cruikshank's home and 300 feet higher. On the top of their respective residences the receiving stations will be located and from there messages transmitted by wire to a room in one of the houses. Both men have small electric shops in their homes, which are filled with a network of wires and many electrical machines and appliances.

The wireless telephone is still a much more unknown quantity than wireless telegraphy. The only progress made with the telephone was by an electrician, who, by talking into the shunt-field of a DC generator, using an ordinary telephone appliance, was able to transmit sound ten miles. Mr. Jack has succeeded in constructing an entirely different system from the one described above, and is confident it will work satisfactorily.

Exchange and Underground Construction

D. R. CRAIG

IN THE construction of a modern telephone plant quality should be the first consideration—quality of material, quality of apparatus and quality of work. A system built with this end in view and with this practice followed possesses those two essentials of success—good service and low cost of maintenance. While it is almost unanimously the case that public sentiment is favorable to Independent telephone companies, coming as they do in the nature of relief from a long period of oppressive monopoly, overbearing methods and poor service, this favorable sentiment must not be the sole reliance, unsupported by any other advantages. We must stand on our merits. We must give the public something better than they had or sentiment will not count for much. For years a community may have tolerated poor Bell service without much complaint, because it was all that was to be had, but when an Independent company enters the field there is an immediate opportunity for comparison, and to succeed the new company should have the best of that comparison. Nothing will give it to them in a greater degree than good service—better service than had been given previous to their advent. This is even a greater lever as a business-getter than lower rates. A poorly constructed plant will not give good service for any length of time.

The maintenance account can prevent more dividends being paid than any other. What satisfaction can there be to investors to see revenues poured back into the plant for rebuilding, repairing and maintaining, when, had the quality of the work in the first place been what it should, and the maintenance thus reduced to the minimum, these same revenues would be going into the pockets of the stockholders in the shape of dividends. A little more money wisely expended in the original construction is better than a constant drain on a company's resources to do work over and over again, perhaps, that should have been done rightly in the first place. Most of us have had our experience with poorly constructed plants and none of us wants any more of them. I am happy to state that the period of experimentation and hap-hazard methods of telephone work is past and the overwhelming tendency is toward first-class construction.

Every plant should be thoroughly planned in advance of any work. Competent help in this direction is an economy. Cover your town thoroughly so that when business comes to you from any quarter of the city, on the completion of your system you are there to take care of it promptly. Locate your exchange as near to the center of telephone distribution as possible, and preferably in your own building. Main leads should be so laid out as to get the most equitable distribution. This is ascertained by going over the field thoroughly and studying it closely, learning the good territory and the poor, and carrying out heavy leads through the former on the most direct routes. Every telephone plant, no matter how small, should have some underground construction, even if no more than that leading from the nearest cable poles into the exchange. Its advantages are obvious, in addition to the sightliness of the work as compared with many cables entering a building through a window or a hole in the wall. The larger the plant the greater percentage of underground construction it should contain. It is the best and ultimately the most economical on account of its low cost of maintenance and the excellent protection afforded conductors from outside electrical influences and extreme weather conditions.

As a general proposition, underground construction should prevail in that part of a city covered by the heavy business district, where there is a multiplicity of overhead wires of different kinds and a congestion of telephone users, and it should also be used for extensions of heavy cable leads into the outlying districts. Improvements in subway construction have kept pace with those in other departments of telephone work, so that it is now possible to construct a first-class system of subways at a considerably less cost than formerly. There are several forms of good conduit manufactured and the methods of laying have been reduced to a science to get the best results for the least outlay. Another advantage of subways is their permanency and the absence of any necessity for repairs. From its very nature any subway plant should be built with all possible regard for future growth, as the difficulty of increasing the capacity of a conduit system already built is far greater and much more expensive than to make it amply large in the first place. Manholes should be located at all sharp angles and at all distributing points. Distribution is made in two ways, by carrying a cable from the subways through a lateral pipe to a distributing pole located in the center of a block or stated territory, the conductors being opened at this pole and radiated to the different subscribers' stations within reach, or by carrying the distributing cable from a convenient manhole through a pipe to an adjacent cellar and running it along from one cellar to another in a limited territory, tapping it as necessity requires to feed into the different buildings. Existing conditions decide which is the better method to use. Entrance of the cables to the exchange should invariably be made through the subways and they should be carried in the most direct way, properly encased in pipes or a chute, to the terminal racks.

A safe rule to follow in city aerial construction is to make your work heavy enough and strong enough to withstand a much greater strain than it will ever be called upon to bear. Get far above the factor of safety rather than below or close to it. By this I do not mean to waste money in extravagance, but spend the money in a way that a greater sum will not have to be expended afterward in repairing defective construction or strengthening weak points that have given way under unusual strain. Build so that you can sleep at night through heavy wind or sleet storms, reasonably secure in the knowledge that the company's property is safe and giving service, even though its competitor may be temporarily out of business. Use good poles; use few cross-arms but good ones; use the best messenger anchor, heavy and strong, and guy often. Modern methods require a liberal use of cable and under the multiple tap plan of distribution it is the best and most economical way, a decided improvement on the old method of loading poles down with a large number of cross-arms and a far greater number of open wires, which make a tempting bait for wind and sleet and an excellent trouble-breeder, to say nothing of their unsightliness. Build pole lines wherever they are needed and carry cable on them as far as necessary to get business.

In every plant built by the writer in recent years he has extended cables to the city limits in every direction from the central office. These cables start from the exchange as large ones, reducing in size as they are tapped into, until at the terminus of the line they are quite small. Using the multiple system of taking out the same conductors at two

Paper read before the convention of the Central Illinois Telephone Association at Peoria.

or more points, makes them available at more than one place, thus making an economical disposition of the cable. Long drops or service lines are obsolete, so cable taps should occur with great frequency. This protection of lines in cables from the office almost, if not quite, to the subscriber's door is another factor toward good service and low cost of maintenance.

Poles should be set on corners and property lines as far as possible and should be sound, straight, symmetrical and sightly. Personally for city construction I prefer western poles, because they more nearly conform to these requirements. Their lasting qualities in this climate have been tested and in price they compare favorably with the native product. All poles should have at least one coat of paint before being set.

The cable and messenger work on a plant is often termed the "heavy artillery work," and it seems to me that this designation is apt. Of all the construction that which supports the aerial cables should be the strongest and most substantial. Anchors should be heavy and set deep. All corners should be substantially guyed and line guys should be used quite frequently. The messenger should be of such size and strength as to easily carry the cable load put on it and should be pulled up sufficiently taut to prevent any great sag. Where several main cables are to be carried along any street for some distance before being opened for distribution, the choice is preferably for underground construction rather than an aerial lead carrying any great number of cables. It is the practice to use larger sized cables for main underground leads than were formerly in vogue—for instance, to use one cable containing 300 pairs of wires rather than one 100-pair and one 200-pair cable. This plan has its disadvantages as well as advantages, among which may be mentioned the greater difficulty of installing the larger cable, and the fact that a case of trouble in such a cable involves more conductors and consequently more telephones. In large cities and crowded plants, where economy of conduit space is a consideration, it is well to use the extremely large cables, but in the plant of average size, where there is ample duct capacity, it is a question if a 200-pair cable is not as large as should be used. Do not try to economize by using small gauge, single insulation cable of insufficient capacity or your service will suffer. In distributing make your taps often and make them in multiple so as to get the greatest benefit of the cable.

The question of protection is an important one in every system. Great care should be used in the selection of a protector to get an efficient one. Lightning cuts queer pranks and none of us can foretell what it will do. Together with sneak currents it is a source of constant danger and sometimes of great damage, so in guarding against it none but the thoroughly tested and most efficient protectors should be used. There are several good makes of apparatus manufactured and one of these should be selected. Whether your system be generator call, automatic or common battery, use a reliable make of apparatus and remember that the cheapest is not the best, but make your selection from one that will meet your requirements and do its work well. Give the manufacturer every show and then hold him to account for the successful operation of the equipment he furnishes. Standardize your apparatus by using the same make of instruments and switchboard. A plant recently rebuilt by the writer contained a varied assortment of instruments of all kinds. I believe that every manufacturer who ever made as many as half a dozen telephones had at least one of them in that plant. Some were built for one special object and some for another, but all were in use for the same purpose. Is it any wonder that that plant had to be rebuilt?

A few words on the question of permits. In most cases a franchise to a telephone company provides that the construction work shall be done under the supervision of some city official or committee. It is often the case that the verbal or general consent for some good proposed piece of work is procured from the proper authority, sometimes after a personal inspection of the locality, but more often not, and when the work is begun some influential and dissatisfied property owner gets in his fine work and through the same official has changes made that are most unsatisfactory from a construction standpoint. Every company has probably had this experience. It is only fair to presume that a prominent resident of long standing has an influence on the average official outweighing that of a man who is a stranger in the community. All this difficulty would be obviated if the franchise provides that for each piece of work a written permit shall be secured from some designated municipal authority before the work shall be begun. This permit should set out as fully as possible the exact locations and the nature of the work to be done. Armed with such a document the company is better fortified to overcome unreasonable and troublesome objections on the part of property owners. However, in this connection I would state that it is not advisable to carry on your work in a high-handed and antagonistic manner. The best policy is to make friends for your company as you go. Meet all comers in a spirit of fairness and without sacrificing any of your own rights have due regard for the rights of others. Carelessness in the use of public streets is not to be tolerated. Excavations, whether for subways or pole lines, should be refilled without delay and the surplus dirt cleaned away. All pavement should be relaid promptly and in the best possible manner. Work should be carried on with as little interruption as possible to traffic, and where it is necessary to leave work open over night it should be plentifully supplied with protecting barriers and danger lights. It is easy to make a good impression on the public in the prosecution of your work, and it strengthens your company.

In city construction competent help should be employed. Men of experience in that class of work are the best to use. They cost a little more, but are worth the extra money. City construction work is not the place to conduct a kindergarten for breaking green men into the business. It is where the heaviest and most complex problems of construction are encountered and they should be met by competent men with a knowledge of the work expected of them.

I have spoken of this subject only in a general way. Its scope is so broad that for the purpose of detail each division is almost a subject in itself. As stated in the beginning, in the material, in the apparatus and in the work, *quality* is the first consideration. No business more than ours requires a stronger application of the adage, "What is worth doing at all is worth doing well."

LIGHTNING EATS UP WIRE.

Telephone linemen working in the vicinity of Cheyenne, Wyoming, tell of a remarkable phenomenon seen during a recent electrical storm, and on several other occasions the past summer. During the storms the toll lines were put out of commission, and gangs of linemen were sent out to repair the damage. In one place, for a distance of several poles, they discovered that the thick wire had vanished entirely, the only evidence of its previous existence being a green streak along the ground between the poles. The lightning bolts had struck the wire and melted it so completely that not even a trace of the metal could be discovered. During every electrical storm this season the toll lines have been struck by lightning and rendered useless until they could be repaired. During June there were fourteen electrical storms and during July eighteen, so that the woes of the telephone companies in Wyoming can be readily understood. Not only has communication over one telephone line been destroyed, but frequently in half a dozen places.

Independent and Bell Service Compared

M. B. OVERLY.

To make a comparison of this kind it is necessary to divide the subject and look at it first from an exchange standpoint and then from a toll service standpoint. If I were engaged in business other than the telephone business, and found that I was handling more business than any of my competitors, I believe I would be justified in considering it a slight indication that my goods were giving as good satisfaction as those furnished by my opponent. If that same competitor, in an attempt to hold his present trade and to regain some that he had lost, should send to the homes of my customers, absolutely free of charge, a fine line of groceries or a suit of clothes to be used with those furnished by me at my regular price, for the purpose of making a comparison for the benefit of those customers (and incidentally for his own benefit), and this were to result in my keeping all of my old customers and in bringing me new ones, I believe I would be modest indeed if I did not consider this an indication that my wares were at least as good as those furnished by others. I believe, also, that if I saw a duck swimming in a pond I would consider it pretty good evidence that that particular duck could swim.

From an exchange standpoint, therefore, it seems to me that the fact that there are almost twice as many Independent telephones in Ohio as there are Bell telephones is a slight indication that the service must be all right. In asking the question as to how the service of one company compares with that of another company, one naturally wants to know how the facilities of the two companies compare.

Our friend, the Bell company, has been in business a great many years and has developed apparatus that is first-class. Their transmitters are excellent. Their receivers are just as good. Their switchboards are the finest and best that man can design and money purchase. They select fine poles and pure copper wire, and employ only the best construction men that can be secured. They also select their managers and operators with care. A combination such as this should give the finest kind of service.

Now you ask, what are the Independent companies doing? In the cities of Cleveland, Akron and Toledo to-day I am quite sure that if you were to blindfold the average man and allow him to talk over either telephone, he could not tell you which one he was using. If you use both services daily, however, you will notice a great deal of difference. The Independent telephone is much more sensitive and distinct. The operator answers more quickly and does not call you so often when she wants someone else. In the larger cities the difference is not so perceptible as in the smaller towns. In more than ninety per cent of the towns and cities where both services are given, the Independent company has the most subscribers, the ratio often being as high as ten to one.

Up to the last three or four years, it was very difficult for an Independent company to purchase first-class telephone and switchboard apparatus on account of patent litigation. Very few Independent men knew anything about how a plant should be built and maintained, and still less about operating it. This is all past now. Independent manufacturers can and do build as good and better telephones and switchboard than the Bell manufactures. Independent men have learned how to build a good plant and how to maintain and operate it. An official in the employ of the Bell company told me a short time ago that he considered the construction work done by some of the larger Independent companies superior to any ever done by the Bell. Nearly all of the Independent plants that were poorly built are being reconstructed and in the best manner possible.

Competent employes were at first hard to secure. Good and experienced men could not be induced to leave a position that was sure for one that was simply an experiment. Time, however, has made a lot of competent employes who have grown up from the Independent ranks, and a great many Bell men have gone into the Independent service because they recognize its permanency and its wide field of influence.

In considering this question from a long-distance or toll standpoint, I think there are comparatively few people, other than those connected directly with either the Bell or Independent companies, who know anything about what strides are being made toward the development of a system of Independent toll lines that will in a very short time reach across the United States. Most people are familiar with the fact, however, that when they wish to talk with anyone in their own state, no matter whether the person called for lives in a large city or at some country cross-roads, the only sure way to reach him is over the Independent lines. Our friends, the Bell, never contemplated the building of a system that would reach all of the people. It was not until Independent telephone companies were organized that this was made possible.

Now when you consider that almost every state is being developed in that way by Independent people, you will agree at once that the local toll business is being taken care of by them in a most satisfactory manner. I think you will also agree with me that to make a vast system out of this Independent development, all that is needed is trunk lines built of large copper wire between the larger cities, thus connecting this network of local toll lines and exchanges. Arrangements have been completed to build a number of these heavy trunk lines this year as well as to increase the number of local toll lines, so that within a comparatively short time it will be possible to talk between points in New York State, Pennsylvania, Maryland, West Virginia, Ohio, Indiana, Kentucky, Michigan, Illinois, Missouri, Tennessee, Wisconsin, Minnesota, Iowa, Nebraska, Kansas, Arkansas, and even Texas, and at the same time to get as good or better service than is now being given by the American Telephone & Telegraph Company. The service now given on the various Independent systems is regarded as superior to that of their competitors.

To sum it all up, therefore, it seems to me that the service that is and always will be the most valuable to the telephone user is the service that reaches all of the people. This must be done at a reasonable cost and without taking up too much of the time of the person desiring to use it. The United States postal service is popular because it fulfills these requirements. The United States government is popular because it is a government of the people, for the people and by the people. The Independent telephone service is popular and successful for the same reason.

WOODPECKERS WORK INJURY

Charles Martindale, a well-known Indiana telephone man, has informed the state board of tax commissioners that the old-fashioned, red-headed woodpecker is an important factor in determining whether or not the dividends of a telephone company shall be large or small. "These birds," says Mr. Martindale, "bore into the poles, make their nests there, perforate them through and through, with the result that within a few years the poles have to be replaced by new ones. This takes money from the dividends."

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RUTS AND ROUTINE.

THE watchword in the Independent telephone business has been, and justly so, "Results first, refinement of method afterward." Most remarkable results have been achieved, and these by their own inertia will roll up greater ones. But as refinement of method must come, or the ultimate results be marred, it is pleasing to welcome in many quarters a recognition of the fact that as the telephone business is peculiarly one of detail, proper routine can bring a great reward.

Popular disgust in examples of red tape is well warranted; yet the business may be conducted so as to get into routine without getting into ruts. Perhaps the margin between rut and routine is narrow, but so, often, is the margin between success and failure. Some one has said that the first object of routine is "to get the work done right." Those who want results but do not care to bother about refinement of method, seem to be wanting merely to get the work done.

Organization does not imply the multiplication of officials, of titles, nor of bureaus. In its simplest terms it merely means that each man shall know what his job is, shall be held responsible for its doing, and shall be encouraged to improve results in and out of his own department. There is a man in New York who works at a ferry landing, and the organization determines that his job is to open and close the gates in letting the passengers on and off. His department numbers two subordinates, and as he does not work as hard with his own hands as does the force under his direction, he has been enabled, by thinking, to establish a routine which saves a second and a half at each landing. To this result he points with pride, and calls it his. In the absence of organization he would have lacked the incentive, and the general science of landing ferry boats would still be operating on a schedule one and a half seconds slower than now.

CITY-OWNED TELEPHONES.

WILLIAM JENNINGS BRYAN, having been interviewed again, this time at Lima, Ohio, has expressed the opinion that the government ought to own not only railroads and telegraphs, but also rural telephones; also, Mr. Bryan thinks, the city governments ought to own the telephone lines within city limits.

James Dalrymple is the Scotch expert on municipal ownership who visited the United States this summer to help Chicago plan out its system of municipal street railways. It is he who offended the enthusiasts by expressing a cautious Scotch doubt whether the American political system is good soil for public ownership plants. While he was in New York he was shown over the building of the New York Telephone Company. They have a plant in Glasgow run by the city. With its workings Mr. Dalrymple is thoroughly familiar. When he had finished his inspection, Mr. Dalrymple turned to the official who had shown him through.

"Compared to this," he said, "our system is a toy."

It was in 1899 that Glasgow decided to adopt the municipal system. They had a private company which had been giving service regarded as unsatisfactory by most of the subscribers. Parliamentary consent was obtained, and in 1901, with impressive ceremonies, the service was opened to the public. The old company kept right on doing business. For a time, since there was great enthusiasm for municipal ownership in Glasgow, it looked as though this company would be driven out of the field. The city corporation of Glasgow started to improve the telephone service by installing a system such as was discarded in the United States in the early '80s. Certain minor flaws in its switchboard features would be understood only by experts.

The general public will understand this part of its short-

comings, however. Whenever a subscriber wanted central, he had to ring a bell and wait for central to answer, as is still the method in the American backwoods. Then, having got the persons he wanted, he rang again. In the "write-ups" in the Glasgow press at the time the system was installed, much complimentary mention was made of that fact. It let the subscriber do his own ringing, and saved labor at the central office.

There were kicks on this system from time to time, so the corporation tinkered with it. They did not go to the length of putting in a modern service; they installed "improvements" in various exchanges. So, at present, on one exchange a card warns you to ring before you take the telephone off the hook. In another you must take the telephone off the hook before ringing; in still another you must "press the red button" before you get a connection.

Finally, last February, the corporation voted $1,500 to install a system of "automatic calling with lamp signals" in one exchange, merely as an experiment. Although offering a rate lower on the whole than that of the old company, the municipality has never been able to pass it in number of telephones in use, it is said.

In its issue of July 5, 1905, the Glasgow Herald published a communication from a citizen—F. Williamson—which reads:

"Sir—I have just had an experience with the Corporation Telephone Department, the circumstances of which may interest ratepayers who contemplate paying for a Corporation Telephone connection. Some time ago, after vigorous canvassing, I was induced to order a telephone; some days later I had a formal intimation that the matter was receiving attention, and after some further days' delay there came a curt request for a bank reference. This seemed little less than insulting, after the pressing solicitation of the department to obtain my order, and I at once replied by cancelling my application. To the insult the corporation added the injury of dragging me into court on a summons for 5 pounds sterling 5 shillings for 'telephone rental.' The sheriff held that there was no binding contract, although he gave a decree against me for 1 pound sterling, without expenses, no doubt in consequence of a statement by an official that some indefinite amount of expenses in arranging wires, etc.—outside, for no telephone had been fitted in my premises—had been incurred. Apart from my personal grievances these methods of delay and blundering tactlessness do not reflect creditably upon the business system of the corporation, in this department at least, and they would go far toward ruining any private enterprise."

THE BELL IN THE PHILIPPINES.

THE American Bell Telephone Company, through one of its sub-licensees, the Pacific States Telephone and Telegraph Company, has gained a foothold in the Philippines, having secured a franchise to operate a telephone system in Manila and throughout the island of Luzon. On the face of this statement there appears nothing unusual, but since the facts regarding the granting of the franchise have reached the United States, and the crafty methods employed by the Bell company in securing the same are coming to the surface, the customary Bell "nigger in the fence" has been discovered, and the fact that the cunning African has beautifully hoodwinked both the Manila and government authorities will cause no surprise among those who know the methods of the Bell in such matters. As might be expected, there is not a little of mystery in the proceedings leading up to the granting of the franchise, the actions of the Philippine commission in the affair not being above suspicion, particularly as the members of that body had promised certain Independent promoters that nothing would be done toward the granting of a telephone franchise without ample public discussion.

In the August TELEPHONY the following statement of facts regarding the franchise grant appeared:

The Philippine commission has passed an act granting to John I. Sabin and Louis Glass of San Francisco a franchise to construct a telephone and telegraph system throughout the Philippine Islands. Mr. Sabin is president and Mr. Glass vice-president of the Pacific States Telephone & Telegraph Company. Their plan includes the locating of exchanges in the principal cities of the islands with long-distance telephone connection and also a telegraphic connection. Besides these improvements cables will be laid among the various islands.

Manila will in all probability be the headquarters of the new company. Already an agent of the company is on the ground attending to the preliminary work. At present there is an antiquated Spanish system in the islands supplying service to only 500 patrons. It is high priced and very slow and unpopular.

The promoters of the new system state that they will invest a million dollars in the project. As the systems expand the amount will be increased, so that in time, as the business demands it, a corporation will be formed to keep abreast of the development.

At the time the foregoing was published this paper refrained from commenting on the same, as it lacked the inside facts regarding the granting of the franchise. Feeling sure that there had been the usual chicanery employed by the Bell in securing this valuable concession it communicated with certain trustworthy and prominent business men of Manila, and has since received the following statement, which may be regarded as absolutely authoritative and reliable:

The franchise secured by Messrs. Sabin and Glass of the Pacific States Telephone and Telegraph Company for a telephone franchise in Manila and throughout the island of Luzon was granted by the Philippine commission *without the slightest semblance of competition or previous advertisement by the government*—the absolute giving away of a highly valuable franchise under most peculiar conditions, that has aroused much unfavorable comment and caused certain suspicions to be voiced in connection with the matter. E. C. Gee, representing the Bell company, came here with full power to act for the monopoly, and the whole franchise affair was rushed through in all its details, except final passage, *while the commission was in session at Baguio, a small village about 100 miles from here in the mountains.*

The aggravating part of the proceedings is that a Mr. Landon, of the electrical firm of Bryan & Landon, is now in the United States for the express purpose of interesting Independent capital in building an exchange here and he did not make the trip, so his business partner states, *until the commission had promised him that no telephone franchise would be granted without ample public discussion.*

Just look at the exorbitant rates they are authorized to charge—P13 per month. (A peso is 50 cents in United States currency.) The "fine Italian hand" of the Bell monopoly is plainly discernible in the granting of this franchise. Mr. Gee made a great bluff about leaving here in an angry mood because the terms of the franchise were unfavorable to his company, but his company finally decided to accept it even if the conditions were rather stringent (?). Do the terms look very bad—$6.50 per month, and fair linemen in unlimited quantity at 50 to 75 cents per day United States currency? Freight rates from New York are $5 per ton, too.

At the request of the writers of the foregoing their names are withheld from publication in order to protect them from persecution and prosecution at the hands of the Philippine commission, as the citizens of that country are not allowed the freedom of speech—even through the medium of an American publication—that they are in the United States, and the above criticism of the manner in which the franchise was granted by the commission would, in all probability, were the identity of the writers known, subject them to arrest and prosecution on the combined charge of sedition and libel, even though they stated the truth in the matter. Thus is the protecting arm of the Filipino government thrown around the tentacle of the Bell octopus that has fastened its grip on the islands of the Orient.

The Manila Times of a recent date had the following to say regarding the granting of a franchise to the Bell:

Louis Glass and John I. Sabin of San Francisco have been granted a franchise for the construction and operation of a telephone and telegraph system in Manila and throughout the island of Luzon. This action was taken by the Philippine commission, and

is the outcome of the conferences held by that body with E. C. Gee at Baguio during the summer session. One clause in the franchise offered by the government was objected to by Mr. Gee and he took a draft of the franchise with him to submit to his company, the Pacific States Telephone and Telegraph Company. This company, in which the American Bell Telephone Company is the largest stockholder, and in which Messrs. Glass and Sabin are the largest individual stockholders, immediately opened communication by cable with the commission, and the governor-general directed sending a cable to Messrs. Glass and Sabin announcing that the award had been made and requesting a notice by cable if it was accepted.

According to the act passed by the commission the franchise is to have force for forty years. Within ninety days the grantees shall file with the executive secretary their written acceptance of all the terms and conditions, and the work of construction on the system in Manila shall begin within six months from the date of such acceptance. The grantees shall also begin the business of transmitting messages and be ready to operate 1,000 telephones in Manila within eighteen months from the date of the passage of the act, unless prevented by an act of God, the public enemy or other inevitable cause. Failure, refusal or neglect to comply with the conditions and requirements will ipse facto terminate the franchise.

As an evidence of good faith and ability to carry the work through the grantees are required to deposit with the insular treasurer, at the time of acceptance, fifty thousand pesos or negotiable bonds of the United States of the face value of fifty thousand pesos.

Should the grantees, their successors or assigns purchase the franchise of the Sociedad de Telefonos de Manila, all rights and privileges acquired by such franchise will be considered as merged in the new franchise, and the telephone system so purchased will be maintained, operated and conducted under the provisions and terms of the act of yesterday and the franchise of the Sociedad de Telefonos will have no force or effect whatever after the purchase thereof by the grantees, or their successors or assigns of the new franchise.

The franchise requires that the system be maintained in a complete, modern, first-class style as understood in the United States, and calls upon the grantees to keep it abreast of the progress of science and improvements. One feature of the franchise is that it is not exclusive, but the commission reserves the right to grant to any corporation, association or person, franchise for telephonic, telegraphic or electrical transmission of messages.

The franchise prescribes how the wires shall be laid, expressly stipulating that whenever twenty-five or more pairs of open wires or other conductors are carried on one line of poles, said wires shall be placed in one cable, and whenever 250 or more pairs of wires or other conductors in cables are carried on one line of poles, said cables shall be placed underground.

The government establishes the rates to be paid by subscribers. Subscribers are divided into six classes. Class A, or those having telephones other than residence telephones with unlimited exchange switching, shall pay not to exceed P13 ($6.50) a month. Class B, or those having a party wire with two subscribers on the same wire, shall pay P9 ($4.50). Class C, with four or more subscribers on the same wire, shall pay P6 ($3). The other classes of subscribers are those who shall have residence telephones, and who shall pay from P5 ($2.50) to P10 ($5) a month. These are the rates for the city of Manila only. For telephones outside the city limits an additional charge of P15 ($7.50) for each additional quarter of a mile may be charged.

In return for the privileges of this concession the grantees are liable to pay the same taxes on their real estate, buildings and personal property, exclusive of the franchise, as other persons or corporations are now or hereafter may be required by law to pay. They are also required to pay over to the insular treasurer annually two per cent of their gross receipts in lieu of taxes on the franchise or earnings thereof.

Provision is also made that the city of Manila and municipalities in which the grantees may establish their system shall have the privilege of using, without compensation, the poles of the company for maintaining a police and fire alarm system.

Now that the franchise has been granted and the Bell officials have it safely tucked away "in their inside pocket," the press and people of Manila have commenced to sit up and take notice, and to realize what has happened. In the first blush of their great joy at the prospect of having a million-dollar, up-to-date telephone system installed in Manila they gave the provisions of the franchise little consideration. Now they are waking up—when it is too late—and the Manila American says of the two per cent clause:

The city fathers are now asking where the city of Manila is going to get off when the two per cent on the gross earnings of the new telephone system is collected by the insular government. They are not unduly worried, but just desire to be shown. In the act that was passed granting the franchise, the two per cent is to be collected by the central government, and it does not state where the city or the province get off at for the use of their streets, roads and highways. When asked in regard to this matter an official of the government stated that it was the intention to divide this money with the city and the provinces. Whatever is collected from the workings of the city system will be shared with the city and the same in provinces in which the system is operated. In granting the franchises it was not deemed advisable to make this stipulation for the city and each province, as Messrs. Sabin and Glass would in all likelihood not care what became of the money after it was once paid over. That was the government's affair; not theirs.

This is a typical Bell deal all through, and no more need be said to condemn it. It gives that company full power to do whatsoever it will in regard to the telephone situation in the island of Luzon, and the right to charge rates that verge on downright robbery. It means that for several years at least, and perhaps permanently, the Bell will have a monopoly of the telephone business in the Philippines, to the great detriment of telephone development in that country. It means that the people will be held up, gouged, insulted and given a service far inferior to what would have been given had the Independents been granted a franchise, instead of the Bell. And as for the action of the Philippine commission in the franchise matter, Mr. Landon may have something to say that will interest the gentlemen composing it. They may yet discover that it would have been better politics to have "toted fair" with Mr. Landon and his Independent friends, instead of breaking faith with the Independent interests and going over body and soul to a monopoly that will oppress the very people they represent to the last degree and bleed them until, in sheer desperation, they finally will turn to the Independents for relief. It is to be regretted that the Filipinos have thus allowed themselves to be "taken in" and hoodwinked by the Bell. They have much yet to learn of square dealing and business principles.

FUNDAMENTALS.

THE very natural object of the telephone engineering departments in the technical school is to prepare young men for a usefulness in the telephone art in a degree they might not have if they were compelled to acquire most of their telephone knowledge after leaving school.

Technical schools merely have recognized the need which has been in existence for many years, and which is most keenly felt by the management of the companies operating large exchanges. The need is that which is manifested by the scarcity of telephone men who are not only alert and industrious, but well informed besides. Mr. Damon and Mr. Kelsey have pointed out certain truths relative to the necessity of experience and the difficulty of getting it without occupation in the art sought to be learned.

As the schools are turning out telephone men, as the field is attractive to the average male person, and as the reward for early service is fairly on a par with that of other industrial activity to-day, there seems to be no reason why a young man with a bent for the telephone business should not enter it, work at it, and succeed.

But there are those who enter the business and spend a considerable time without reaching a satisfactory feeling that their progress is all that might be wished. In such a case it is most valuable to analyze the situation, to learn, if possible what may be the matter. Granting, of course, that the failure is not because of an insufficient capacity, it is believed that the difficulty in most cases will be found to be a failure to recognize the value of thoroughness, and more than this, a failure to realize that the most vital element of success is a constantly active determination to get hold of the particular reasons for things.

There are two ways of testing the truth of any questionable thing. One is to reason about it; to apply the principles of logic to the facts which may be at hand; another—and a more direct and certain way—is to perform experi-

ments. To prove that the young men in the telephone business to-day are not universally attempting to advance themselves by mastering the fundamentals of the art, it is interesting to ask a considerable number of them, one by one, to explain in simple terms just why some well-known and homely part of a telephone system operates as it does. The results are striking, for two reasons: One, because some of the explanations are extremely lucid, and the other because a very large majority of the answers indicate a total failure to have thought clearly about the thing at all. The experiment is all the more conclusive when the question is wisely chosen to be a very simple one.

It is related of the great Maxwell that in his youth he particularly wished to know why many things happened. Asking some one why an electric door bell rings—or as he expressed it "What is the 'go' of it?"—he was given a fair explanation. As this did not reach the bottom for him, he asked again: "But what is the *particular* go of it?" It was this attitude of mind which enabled him to leave behind him not only broad explanations of the "particular go" of many things but loosely explained before, but to explain in advance, phenomena which at his death had not been discovered to exist at all.

The volume of literature about the telephone business increases day by day. Yet there is in it by no means a preponderance of exact information about "how to do things" and about how things come to pass of themselves. Very probably this absence, so unfortunate for the beginner, is due to the very lack of self-training to which we are referring. There is no phase of self-culture in technical lines which is of such immediate and lasting benefit as a course of training in investigating the particular go of things.

DAMPER ON BELL TACTICS:

THE following letters received by the officials of the National-Interstate Telephone Association and given to TELEPHONY for publication are self-explanatory, and show in a measure the good work which is being carried on by the association's bureau of publicity at Cleveland:

Connersville, Ind., July 30, 1905.

James B. Hoge, Cleveland, Ohio:

No truth in rumor of any deal with Central Union.

L. A. FRAZEE.

Lorain, Ohio, August 18, 1905.

Mr. John A. Harney, Cleveland, Ohio:

Dear Sir:—We received your letter in which you quoted the Western Electrician about the Bell Telephone Company purchasing the Black River Telephone Company. We wish most emphatically to deny this statement. We have not negotiated with the Bell company and have never received an offer from them. We wish also to state that the Black River Telephone Company is not for sale.

Yours Very Truly,

THE BLACK RIVER TELEPHONE COMPANY,

A. V. Hageman, Treasurer.

Lorain, Ohio, August 19, 1905.

Mr. J. A. Harney, Cleveland, Ohio.

Dear Sir:—Replying to yours of the 15th inst., I beg to advise you that so far as our knowledge extends, the Bell interests are not seeking to purchase the Black River Telephone Company, and it is my opinion that our people do not care to sell their property.

Yours Truly,

E. M. PIERCE, President.

Los Angeles, Cal., August 25, 1905.

James B. Hoge, President N.-I. T. A., Cleveland, Ohio.

Dear Sir:—I have your favor of August 14th relating to a possible tie-up with the Bell company. I can say, too, and from the fullest knowledge, that there is not the slightest chance for such a deal. It is impossible. All the stock of the Los Angeles Home Telephone Company is pooled for ten years, and the same condition exists for most of the companies in California, as well as the long-distance. I think the rumor comes from the fact that the Bell company have been, and now are, circulating petitions asking subscribers to sign, asking a consolidation. They do not admit they are the source of the petition, but we know they are. You may deny emphatically the rumor of possible consolidation or connection of any kind. I am,

Yours Truly,

JOHN VAN LIEW, General Manager.

INDEPENDENT LONG-DISTANCE SERVICE.

THE long-distance service of the Independent companies of the United States is becoming so complete that it is more and more a factor in business life, and in ways which only a few years ago were unknown, and which are still among the novelties of telephony. The long-distance telephone is one of the greatest of time savers. An illustration is found in the case of a man who, having been taken ill when about to start on a journey, telephoned to the people whom he had intended to see in half a dozen cities, and transacted his business so successfully that his proposed trip was not necessary. By a few hours' use of the long-distance lines of the telephone companies he saved several hundred dollars in money and a week's time.

Long-distance telephone is of assistance to the mariner. The captain of the coastwise steamer bound to a city a hundred miles from his sailing point calls up the local weather bureau at his destination, and often receives information which, in connection with the regular predictions, is of assistance to him in determining whether he shall put to sea or remain in port.

Both in long-distance and local business, the Independent telephone companies give the American people a service which is available for use by everybody, and is at the same time adapted to the special needs of any class of patrons. That the American people appreciate the benefits of such a service is shown by the steady growth of the Independent companies.

SPECIAL CULTURE VS. NATURAL GENIUS.

IN REFERRING to the death of Alexander Melville Bell, father of Alexander Graham Bell, patentee of the telephone, Harper's Weekly of a recent date says:

"Alexander Melville Bell, who died August 7, was the son of Alexander Bell, professor of elocution in London, and the father of Alexander Graham Bell, the inventor—or, at least, the successful patentee—of the telephone. The sequence of studies that led to the telephone is interesting to trace. We have Bell, the grandfather, a teacher of elocution; Bell, the father (who has just died), trained by his father in a mastery of vocal speech, and devoting most of his life to teaching the deaf to speak. He is credited with the invention of visible speech, and with the method of lip-reading which enables deaf persons to see the spoken words they cannot hear. Bell, the son (Alexander Graham Bell), trained to the hereditary profession, and taught to concern himself with sounds and the conveyance of them, was also devoted in early life to the training of the deaf to speak and in the use of visible speech. The great development in the use of electricity that came thirty-five years ago found him with his mind already occupied with problems of sound and its transmission, and the Bell telephone followed."

This is all very pretty, and the average layman in reading it, and without going into the merits of the case, will coincide with the views of the writer; but how about Elisha Gray and the other men who invented telephones, and whose achievements in this line preceded that of Bell? Were their inventions the slow result of three generations of special culture?

Tragedies and Romances of the Telephone

M. C. BARRY

HOW many and varied and ingenious are the uses to which the telephone is being put in these strenuous days of the twentieth century? There are a thousand and one different uses of the telephone. Sweet maidens have long since been wooed and won over the telephone; and elopements have been planned, but it was not until recently that marriage ceremonies were performed over the telephone wires. Physicians have long since been called to the bedside of a sick patient by means of the telephone, but not until recently has a physician prescribed the telephone for a medicinal purpose much as he would prescribe pills and tonics.

Telephones have long since been used in summoning witnesses to court and announcing to lawyers when their cases would come for trial, but not until recently have courts been held and justice meted out, with the representative of the law at one end of the wire and the accused at the other. Burglars have been frustrated and murders witnessed by means of the telephone. Through its agency funeral services, otherwise impossible, have been conducted. Sermons have been heard, school boys' lessons recited and lectures have been delivered over the telephone.

Indeed, so many and varied and ingenious are the uses of the telephone that one pauses in wonder and amazement and asks: "What will next happen by means of the telephone?"

The part that the telephone can play in tragedy was well illustrated in Indiana last summer when Mrs. Mollie Starbuck and her innocent little babe were ruthlessly murdered at the Starbuck home near Greensboro, Indiana, one evening while the mother and babe were at home alone. After the bloody crime of murder had been committed the bodies of the woman and her baby were thrown in an old abandoned well situated some two hundred yards from the house. There they were found some time during the night after the murder.

On the evening of the tragedy, while Mrs. Starbuck's husband was away from home, the defenseless woman was attacked by men whose purpose was supposed to have been robbery. When she was attacked, the frenzied woman broke away from her assailants. It was a matter of life and death with her. There seemed to be no way of escaping with her life. Her only recourse was the telephone, by the use of which she hoped to attract the attention of someone along the line. As is common in rural districts, her home and those of a dozen or more of her neighbors were connected on a single-party telephone line. In her frenzy she managed to give one vicious ring of the telephone, and then, taking down the receiver, she gave one piercing scream. The party call summoned to their telephones a number of the subscribers on the line.

While she was thus endeavoring to call help, Mrs. Starbuck was torn away from the telephone and the receiver fell by the side of the instrument. This left the connection open, and the people, who had responded to the frantic call which the woman had given after ringing the bell, heard the screams and struggle that took place in the Starbuck home between the helpless woman and her vicious assailants. One terrifying part of the whole affair was that not one of the dozen or more listeners could tell exactly in what home along the line the fearful tragedy was being enacted. Still they knew that something terrible had happened somewhere.

Another terrible tragedy told by telephone occurred in Minneapolis last February, when James Jennings called up his friend, George Hartsock, a former admirer of Mrs. Jennings. As Hartsock said "Hello," in answer to the call, he was asked by Jennings to hold the line for a few moments and he would hear something. Hartsock, wondering, held the receiver to his ear. He did hear something. In a few moments he heard sounds of a struggle. There were agonized screams in a woman's voice, and frantic calls for help. Then, as the listener stood rooted to the spot with horror, and scarcely realizing what the wires bore to his ear, he heard two pistol shots and the fall of a body.

"Hello! Hello! Hartsock, did you hear that?" inquired the voice of Jennings over the telephone.

"Yes," replied the terrified listener. "In heaven's name, what is the matter?"

"Oh, I have just killed my wife," was the cool and staggering reply. "Now, listen to this."

"This" was another revolver shot, followed by another fall of a heavy body. Jennings had placed the pistol to his own head and blown out his brains.

Hartsock will never forget this tragedy of the telephone.

However, the uses of the telephone are not all tragic in their nature. A recent case has just been reported from northern Indiana where the telephone was used as a means of conducting a funeral. It was in the case of a death from a contagious disease, which thus prevented the relatives and friends from gathering at the coffin of the departed loved one and hearing the eulogy pronounced by the minister. The funeral of Miss Mary Gilman, an attractive young girl of but eighteen summers, was recently held in this way. The girl had died of diphtheria. As the house was quarantined, it was impossible to have services in the usual way. Friends, however, gathered at the church in the village, two miles from the Gilman home, where the pastor conducted the last sad rites, while the grieved parents and members of the girl's family at home listened to the service over the telephone. Arrangements for this had been previously made by installing a telephone in the church temporarily.

Telephones have other uses beside those just given, in which the tragedy and the sadness of life have been revealed over the telephone. The telephone can, and has, played a happier part in this drama of life. It has been known to figure conspicuously in wedding ceremonies. Many cases are on record of where couples have been married by telephone. A recent instance of this sort was enacted in Philadelphia. Frederick Mehren, a patient at the Municipal hospital in the Quaker City, was pronounced by his physician to be fast approaching the "valley of the shadow." The saddest feature of his nearness to death was that he was soon to have been married to Miss Eva Lyons, the sweetheart of his boyhood days. He fought twice as bravely against the ravages of disease in order that upon his recovery he might be privileged to enjoy the fondest hope of his life—his marriage to the girl whom he loved. But that seemed impossible. Death was coming too quickly, too surely.

Mehren appealed to his physician. He wanted to be married before he died. Likewise Miss Lyons was desirous of becoming the wife of the man she loved, despite the fact that she knew he could live but a few hours, at most until after the ceremony which would make them man and wife. After two or three attempts to summon a minister by telephone had failed, because no one seemed to care to stand at the bedside of a man afflicted with

smallpox and perform the solemn marriage ceremony, the attending physician, anxious to see the last wishes of his patient gratified, suggested that the lovers be married by telephone. The suggestion was at once approved.

A telephone was fixed up at Mehren's bed in the hospital and the bride-to-be took her place at the dying man's bedside. Standing at his telephone in his pastoral study in another part of the city, the Rev. John McLeary read the service that united the man and woman in marriage as effectually as though they were personally standing before him. The bridegroom was greatly pleased with the marriage by telephone. Likewise the bride was pleased. However, they were not permitted to enjoy the happiness of married life for any length of time. Death intervened and the husband survived but a few hours.

The wedding of an Indiana couple, in which the telephone was made in evidence, took place recently in Cincinnati. Miss Martha Louise Harmon and Harry W. Walten, living near Lawrenceville, Indiana, ran away to Cincinnati to be married. The ceremony was to be performed by a Cincinnati minister and during the preparations the bride-to-be suggested that it would be nice, after all, if her mother could hear the ceremony.

"I am worried because mother isn't here," she said, "and I should like for her to see me married, but I don't want her to know that I am to be married till it's too late to prevent the marriage."

The minister probably had been in the same predicament before. At any rate he unhesitatingly asked if Mrs. Harmon had a telephone in her house.

"Yes, she has," replied the girl, joyfully, for she knew what the minister had in mind.

"Good, then," he replied, "if she cannot witness the wedding, she can hear it. I will simply call her up by long-distance and let her hear every word I say." Presently he had Mrs. Harmon at the other end of the wire. Meanwhile he had placed his own telephone directly in front of him on a hastily constructed base, so that, as he pronounced the words which made the couple man and wife, he would talk directly into the transmitter.

"Is this Mrs. Harmon?" he asked, as soon as that woman, standing in her Indiana home twenty or thirty miles away, answered the ring of her telephone. "Yes? Well, then, stand where you are for a few moments and listen carefully to what I have to say over the telephone." She listened, and listening, she heard her daughter made the bride of Mr. Walten. After the ceremony the minister explained all that happened, and how it had happened.

Surprised! Of course, she was surprised. But she was one of those women who are always prepared to meet any emergency. She at once requested her daughter to come to the telephone. Then she showed her good judgment by heartily congratulating the newly wedded Mrs. Walten and asking her and her husband to come and visit their mother at the earliest possible opportunity.

Not until a few weeks ago was it known that the telephone possessed medicinal qualities. Such is the case, however, and one Indianapolis physician regularly prescribes the telephone in certain cases just as he would prescribe pills or tonics. "Some time ago," said the doctor, speaking of his new twentieth century remedy for certain kinds of ailments, "I was considerably worried by the case of a patient named—well, named Brown. He was suffering from a chronic trouble, which kept him confined very closely to the house. Previous to his sickness he had been an energetic business man, and was fond of social life and the companionship of his friends. Naturally he chafed under confinement, and his mental condition grew harmful to his physical well-being. He became fretful and despondent.

"One day, while thinking over the case, and recalling his former habits of activity, the idea occurred to me that if he could not get around as formerly, he could at least use the telephone. Acting on the thought, I ordered an instrument installed in his room, and from that very day he improved. It was indeed touching to see his great delight in being able to chat with his friends in different parts of the city. That pleasure was worth more to him than all the medicine in the world.

"Since that time," continued the doctor, "I have frequently prescribed the telephone, and it has worked benefits where medicines have failed. I believe that telephone systems ought to be installed in our private sanitariums and hospitals, and so arranged that patients lying in bed could use them. I am sure that many, many times they would prove the best tonic that physicians could find."

Instances of where overworked Cupid has been aided materially by telephones can be found without number. Reports come almost daily from all parts of the country of instances where the telephone has been put to Cupid's use. Proposals of marriage have even been made over the telephone and hundreds, possibly thousands, of elopements have been thus planned. Only a few Sundays ago Robert Bennett, a telegraph operator at the Monon station near Indianapolis, wooed and won his bride by telephone. She happened to be the telephone operator and Robert fell in love with the gentle voice at "Central" which answered "Number, please," every time he had occasion to use the telephone. Soon afterward he personally met Grace (that was her name). Their marriage speedily followed.

Even the Goddess of Justice has used the telephone in the trial of cases. The other day a justice of the peace sat at his desk in an Indiana county seat town and called up Herman Kreuger, living in an adjoining town ten miles away. The following dialogue took place over the wire:

"Is this Mr. Kreuger?"

"Yes."

"This is Squire Winters in Angola."

"What can I do for you, Squire?"

"You are charged with having shot and killed an American bald eagle, contrary to the laws of the state. Shall I send a constable out to serve a warrant on you?"

"Don't, please, Squire. I'm confined to the house with the grip, and can't come out."

"All right. Will you plead over the telephone?"

"Yes. I shot the bird, but I didn't know it was an offense to do so."

"Ignorance of the law is no defense, you know. Do you plead guilty?"

"Yes."

"The court accordingly fines you $25 and costs."

"All right, Squire. Is that all?"

"Isn't that enough?"

"Yes."

"Well, then, good-by, Mr. Kreuger."

"Good-by, Squire. Thank you for not bringing me out to-day."

And then they rang off, and the first trial by telephone in Steuben county, Indiana, was concluded by the clerk's entry of the fine opposite Kreuger's name in the court records.

Other cases somewhat similar to this one have been reported from other states. At Salem, New Jersey, on October last, William Perrine was arrested, charged with shooting a bird that was protected by law. Magistrate D. Harris Smith called Perrine up by telephone to notify him when to appear for trial. Mr. Perrine said he was ready for trial then and there, and wished to plead guilty. Whereupon the justice called the case for trial, arraigned the accused, received his plea and promptly fined him $26.

Another instance is on record where a man in Sacramento, California, submitted his case by telephone to a magistrate in San Francisco and was perfectly satisfied with a long-distance trial.

Probably the greatest distance a witness has ever telephoned his evidence is a thousand miles, which occurred in November, 1903, when a man named Davis was examined over the long-distance wire between New York and Chicago. The witness in this instance was not considered to be of vital importance to the case, and, in fact, had not been summoned to give evidence, but during the hearing the jury expressed a desire to put a certain question to him over the telephone, and to this the judge consented. Davis was accordingly rung up and questioned. His answer had a pertinent bearing on the case, and his further evidence was considered so important that the trial was postponed two days in order to permit his appearance in person.

At Frostburg, Maryland, Constable Owen England recently arrested a man by telephone. Summoning the accused to the telephone England told him he was under arrest. The man acquiesced and promptly appeared for trial.

As the means of summoning the police and interfering with the work of robbers, the telephone has performed some notable feats. Superintendent Kruger of the Indianapolis police department says that the telephone is a very important part of the city's police system. In the first place, the patrolmen on their beats report at regular intervals to headquarters. For this purpose telephones have been installed specially for the police patrolmen in all parts of Indianapolis. This also is the custom in all cities of any size.

Last summer a lucky North Pennsylvania girl foiled two robbers in their attempt to rob her home by first calling up police headquarters and then quietly watching the burglars until the arrival of a couple of bicycle policemen a few moments later.

Telephones have already been installed along the electric interurban lines that center into Indianapolis and Pittsburg, and they will soon become permanent and familiar fixtures in the trolley cars. Even now it is possible for motormen or conductors to secure telephone connection at any place along the line, simply by connecting the instrument which they have in the car with the telephone line along the track. No doubt, before long, patrons of all interurban lines will be able to telephone wherever they wish while traveling through the country.

In some parts of the country experiments have already been made of using the telephone as an adjunct to the village postoffice and for the delivery of telegraph messages.

A genius of Indianapolis is now preparing to give business men of that city who are unable to employ individual stenographers opportunity of having their work done by wire. The subscribers to the system will simply dictate their letters over the wire to stenographers at headquarters. These girls will then typewrite the letters and distribute them to the persons by whom they were dictated. In this way one stenographer will be enabled to do the work of ten or a dozen firms.

Listening to sermons over the wire is not new. Celebrated ministers throughout the country frequently preach to widely scattered congregations in this way. Megaphones in front of the pulpit gather in the words of the minister and the telephone does the rest.

To recite lessons by wire is among the most recent uses to which the telephone is being put. In the graduating class of an Illinois high school is a boy who was recently compelled to give up his recitations owing to a broken leg. He seemed certain to drop behind his class and miss graduation. This thought gave him some anxiety. He telephoned his professor and asked if he would allow him to recite his lessons by telephone. The professor was willing, and now the young student, as he lies in bed with his leg in a plaster cast, is keeping along with his class.

Some of the smaller schoolboys find that the many uses of the telephone do not appeal to them as strongly as they do to this student who is prevented by sickness from attending his recitations. Here is the novel use to which scores of mothers are putting the telephone in keeping track of their young sons in school. Reginald will serve as the name of each boy, Mrs. D—— as Reginald's mother and Miss H—— as Reginald's teacher.

Reginald invariably shows a propensity for wandering off in other directions when sent to school, and when leaving school to start home. At first Reginald did not know why his mother always learned when he left school for home; nor did he know why his teacher always learned when he left home for school. He knows now. The reason for this is that his mother has devised the following ingenious scheme: There is a telephone in the schoolhouse and also one in Reginald's home. Just as soon as the boy has banged the front gate after him the following dialogue begins over the telephone:

"Miss H——," the mother will call.

"Hello!" Miss H—— answers.

"I want to let you know that Reginald has just started to school. If he does not reach there inside of five minutes please telephone me."

"Very well, answers the teacher.

At noon the order of telephoning is just reversed.

"Mrs. D——," the teacher calls, "I called up to tell you that Reginald has just left the schoolroom. If he does not turn up in five minutes let me know."

With two such vigilant women watching over him, is it any wonder that Reggie has quit trying to play hookey?

INDEPENDENTS RAPIDLY INCREASING.

A recent issue of the Austin (Texas) News-Tribune prefaces a big list of new telephone subscribers of the Independent company of that city with the following comment:

"Owing to a magnificent increase in the subscription lists of the new telephone system in Austin, the management has enlarged the local offices, put on additional crews of workmen and operators, and is reaching out after business. A network of wires strung over every well populated district in the city tell the story. New telephone lines are accessible and operative everywhere. The real value of a telephone speaks for itself. Austin has no more valued fire alarm than the telephone, no more adequate police call, and certainly no more ready help in times of emergency than the telephone. Commercially, the telephone has come to be as necessary as the clerical force in any business. 'It takes time to listen,' but that time is no more costly than that spent by a clerk in making sales—perhaps less—it does not last as long. As a means of saving time, no man can produce an equal to the telephone.

"During the life of the Independent system in Austin the service has been second to none, the lists have grown steadily, and subscribers are universally satisfied. The average business man repels any effort to upbuild the new system when he says 'Two lines are a nuisance.' Two lines are necessary. One cannot reach the classes, neither can one line satisfactorily handle the calls, as they are growing more strenuous daily. The busy, energetic business man and the careful housewife alike share benefits by the use of the telephone. The former is enabled to 'get there first'; the latter to do her shopping and attend social matters without the necessity of dressing and making a trip down town. The new telephone saves steps and nerves, as no other means can serve, the interests and convenience of the public.

"The Independent telephone system in Austin, while conservative in accepting subscribers, has had a larger percentage of increase during August than ever before, and at present, the working forces are pushed to utmost capacity, placing new telephones."

Digest of Telephone Patents

Conducted by Edward B. Clement

797,015—E. C. Parimore. Induction Arrester.

This is a neutralizer, intended to kill annoying inductive affects on metallic circuits. An induction coil has two terminals, each connected in one side of the line and a secondary of the same resistance has a line connected around one of the primaries.

The theory is that induced currents in the primary circuits produce equal and opposite currents in the secondary, to neutralize their own effect.

797,526—T. R. McBerty. Switch.

It has become quite common to have jack boxes, or as they are otherwise called poll boxes, distributed along the line of an electric railway, in city streets and the line, so that conductors, policemen, or authorized persons carrying portable telephones may plug in and call central from various points.

The present invention comprises a jack box of this type having a lock for the jack, and a key carried on the plug, so that unauthorized persons cannot obtain access to the box or to the jack. In the figure herewith the jack is shown at *a*, supported on a frame *c*, *c'*, upon which slides a carrier *e*, which normally falls by gravity into the position shown in the drawings, closing the jack opening and spreading the springs so that they cannot be touched. In order to lock the guard in this position the long spring *a* has its tip act as a latch, taking over a projection on the carrier. The plug has projections *h'*, h^2, and the carrier is cut away at e^2 and a transverse pin is provided fitting a slot in the plug key. When the proper plug is inserted its shoulder *h'* lifts the latch springs its slot fits the pin, and the cord is moved up as the plug is inserted. Of course plugs that do not fit will fail to produce this result.

797,561—J. McK. Clement. Telephone Hook Switch.

This is a long lever switch in which the contact springs are separated from the lever, the latter forming no part of the circuit, but having prongs 19-20 which move the outside springs 16 and 17 up and down into contact with the fixed middle springs, instead of the usual construction whereby the middle spring is moved to contact with the others. All parts of the lever which touch the springs are insulated.

797,586—E. Land. Telephone System.

The subject of semi-automatic systems and apparatus is one that has been very considerably agitated during the past year. Mr. Land is an engineer with the Citizens' Telephone Company of Grand Rapids, Michigan.

In the present patent Mr. Land describes and claims merely a scheme for picking out an idle trunk without the use of an order circuit and the passing of an order back. He says the number of trunks which may wisely and with economy be terminated upon a position of the incoming trunk switchboard is such as the operator can keep in use all her maximum effort during the busiest hours. The efficiency of each trunk of a group varies as the number in the group. If each trunk in a group of 10 will carry 75 completed calls per day, each trunk of a group of 30 or 40 will carry approximately 150.

The gist of the invention is the provision of a rotary switch connected to each trunk jack before the subscriber's operator, the switch having a bank of contacts *C'*, C^2, etc., constituting multiples of many trunks. The operator merely plugs into a vacant jack, and current in the usual subsidiary circuits energizes a relay which starts the switch, the latter then rotating continuously until it strikes idle trunk terminals, whereupon the switch is stopped and a guard lamp associated with the jack and lighted during the selection is at once extinguished. These automatic switches can be made with anywhere from 50 to 100 contacts, and hence the groups of trunks can be increased considerable in size.

797,761—C. Turchi. Composit Telegraph and Telephone Systems.

Mr. Turchi is an Italian engineer, residing at 89 Via Giovecca, Ferrara, and his invention is an improvement on the old Van Rysselberghe and other systems well known. The line wire and telegraph instruments directly connect with it, and for the telephones a central station receiving end having a branched circuit with its two halves differentially wound on a core carrying a tertiary winding connected to the receiver. One of the branches contains an adjustable magnetic resistance. Substantially the same arrangement is found at the subscriber's end, and the transmitters in both cases are connected to the other circuits through induction coils, which also forms the media for line connection to the receiving circuits.

798,031—W. I. Gherky. Conduit Stopper.

Mr. William I. Gherky, whose address is 334 North Broad street, Philadelphia, was very well known for his designs of telephone apparatus a few years ago, and is now actively and very largely in practice as a subway engineer. That he suffers from the inventive habit is evidenced by the very neat invention here patented. Every one knows the troubles that are experienced from improperly stopped ducts. If wooden plugs are used and the trench should fill with water in the night, it is quite likely that more than one end will be found broken in the morning by the swelling of the plugs. Such plugs are also a nuisance to cut and together with other forms of stopper are easily tampered with by mischieous children. Mr. Gherky has a rod about 12 inches in length, upon each end of which he bolts a flexible disk, made of canvass impregnated with rubber, and outside of each disk he secures a bail. The disks are slightly larger than the bore of the duct so that when the device is forced into the end of the tube the disks will dish somewhat, making a tight seal. The idea is that the stopper is to be forced far enough in so as to prevent children or others from tampering with it, the foreman on the job or other workmen being provided with an iron hook to reach in after the plugs when desired. In pulling them out it will be noticed that the strain is against the edge of the disk, and this is found to clean out all gravel, silt, etc., which may have washed in outside of the plug very effectually.

798.035—C. R. & I. R. Greene. Telephone System.

This is a lockout party line scheme in which the switching device is connected at the juncture of the branch with the main line. Each instrument comprises a controlling switch, and two sets of electromagnets, one set when energized establishing connection between the main and branch circuits, and the other set serving to interrupt the same. In the diagram herewith the main or trunk circuit is shown at *16-17* and the branch circuit at *18-19*. The diagram shows normal conditions except that the switch *20* should be in connection with the contact *22* to enable the party line subscribers to talk among themselves without

interrupting the main or trunk line. Should a subscriber desire to call central, the key *21* is operated, energizing magnet *B*, which breaks apart *6* and *10* and closes together *8-12 and 9-14-13*. The lever *2* is then held by the lock *5* and the party line branch is in circuit with the main line. To restore, the subscriber uses key *20*, and as above works the magneto *M*. This energizes magnet *A*, which releases the switch *2*. In calling out from central, the magnet *B'* is energized and in restoring the wire *16* is employed, reaching magnet *A* through the closed contacts *13-14*.

798,043—J. W. Lattig & C. L. Goodrum. Automatic Listening Apparatus for Telephone Operators' Cord Circuits.

This is a scheme for cutting in and cutting out the operator's telephone automatically in the ordinary use of the cord circuit apparatus. Two relays are provided *K*, and *K'*, associated with the answering and the calling plugs, respectively. When the answering plug *P* is inserted in a jack, relay *K* cuts in the operator's telephone set *O*. When the number wanted has been ascertained and the line tested, the operator sticks the calling plug *P'*, whereupon the flow of current from the common battery will energize the relay *K'* to cut off the telephone.

798,838—E. H. Strauss. Telephone Exchange System.

This is a type of system which is not often seen nowadays, comprising a so-called cross-bar switchboard and Western Union plugs. Each line comes in to a strip in the switchboard, and strips of one set are connected to corresponding strips of the other set, each strip of one series is also connected with an annunciator, and both series of bars are provided at other intersections, other than where permanently connected, with plug holes.

12,383—N. S. McKinsey & A. R. Nelson. Re-issue Telephone Selective System.

This is a selective party-line lock system, and the patent is a re-issue of No. 755,691, granted March 29, 1904, and digested in our issue of May, 1904.

Each telephone on the line has a dial on the front, and a clock-work mechanism spring-driven, which requires winding. All the clock works are supposed to run in exact synchronism. One side of the line extends unbroken through all the stations, while the other side passes through a pair of normally closed contacts and a controlling relay in series at each station. A pair of pivoted levers is provided, acting in conjunction with a selector disc on the clock work, and a magnet under control of the main line relay starts and stops this disc. The line has a common battery at one end, as shown at *1*, and in the diagram four stations are illustrated, two at the end showing the outside merely, and the other two in diagram. In calling, the subscriber takes down his telephone from the hook *9*, which rises, catches the spring *4* on the lever *16*, and opens the circuit *28* of the control relay *6*, or in other words the metallic circuit. Talking currents would still pass through the condenser *95*, but for battery currents the line is broken. Relay *6* at each station energizes magnet *32*, which pulls down the rod *35* until the calling subscriber pushes in button *52*, closing shunt *57-58* around the springs *4-5*, again energizing relay *6*, releasing rod *35*, and permitting the clock works to run on. The selector pin *25* is fixed at a different point on the disc *26* at each station, and when the hand on the caller's dial has turned to the wanted number the pin *25* at that station has turned into contact with the lever *16*, closing the bell circuit *71, 72, 73, 75, 76* and *16*. When the called subscriber takes down his receiver, the secondary circuits are both bridged across the wires *29* and *28* through the respective condensers *92* and the clock work.

798,123—J. L. Wright. Telephone Switchboard.

This invention is a cordless switchboard. Instead of cords conducting sheets or strips are employed with interposed installation and holes drilled through them constituting the jacks. In each hole is a pair of spring sliding arms *J*, having a forward pair of jaws, *c2*, movable in the orifice to make contact with any of the strips, and a rearward pair of jaws sliding between metal terminals constituting tip and sleeve terminals for the line. In order to connect a pair of lines, a pair of plugs corresponding in length are inserted in the jack of the calling line and in the jack of the called line, respectively, both of which then have their sliders *J* pushed in exactly the same distance, so that their outer jaws rest on the same strips or layers, whereby the two lines are connected. In order to keep track of the lines connected, the pairs of plugs may be connected by non-conductors, such as pieces of string. Also, in order to connect listening and ringing apparatus and the like, suitable keys may be provided as usual, connected between the sections of the strips. The diagram herewith indicates the terminals of two lines *L, L*, with their sliders, *J, J*, and plugs *P*. The shorter plug connects the calling line *L* through the clearing-out drop.

While this invention may not be extensively used on switchboards of any size, it furnishes a ready means of dispensing with cords and their troubles, and is quite applicable to such structures as test boards.

798,252—B. P. Bartlett. Anti-hummer for Telephone Wires.

This consists of a globular body of insulating material, with a hole through it and grooves around it at right angles. The line wires are tied in separate grooves so they do not touch, and in order to make electrical connection between them a soft wire is passed through the hole and connected at its ends.

798,319—M. Bouchet. Electrical Binding Screw or Terminal.

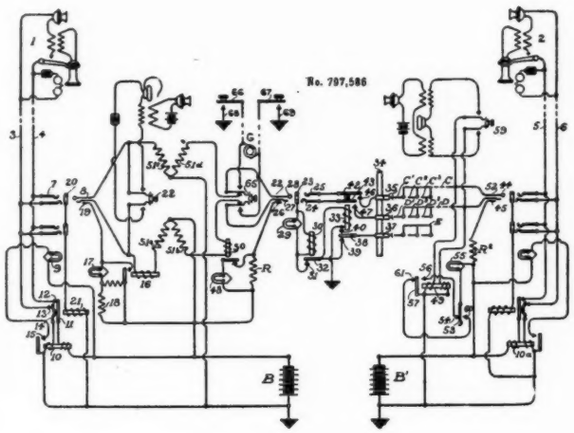
This is a binding post or sleeve which the inventor shows in many forms, but the underlying principle is the same in all. The screw is tapped down into the body, and the opening for the end of the wire is drilled into the body at a tangent to the screw, and a groove around the screw is then formed so that when the wire end is poked in it will curl around the stem of the thumb-screw.

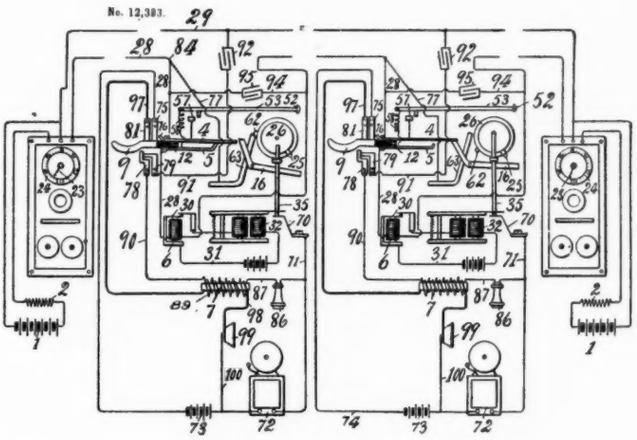
798,555—C. Adams-Randall. Switch or Cut-Out for Telephones and Circuits.

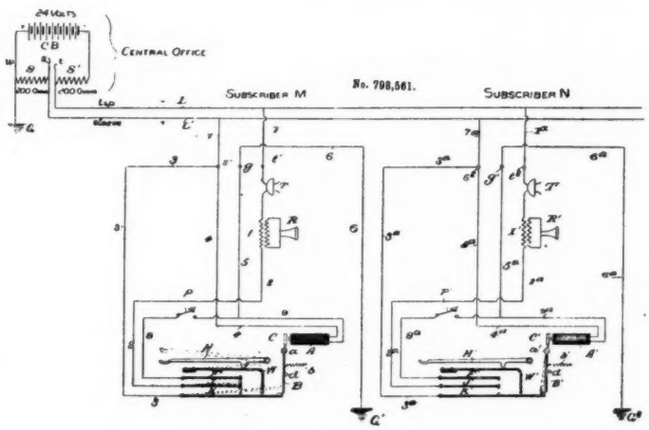
This is a simple form of switch with a sliding contact body rubbing under a set of three springs, by means of which when one is talking the receiver may be cut out; when listening the transmitter may be cut out, and the disagreeable effects of side tones in one's ear thereby avoided. The claims are not as broad as this statement, however.

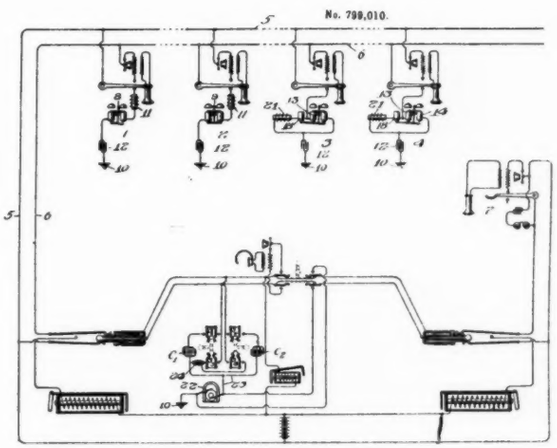
798,561—M. P. Boone. Common Battery Lock-Out Telephone.

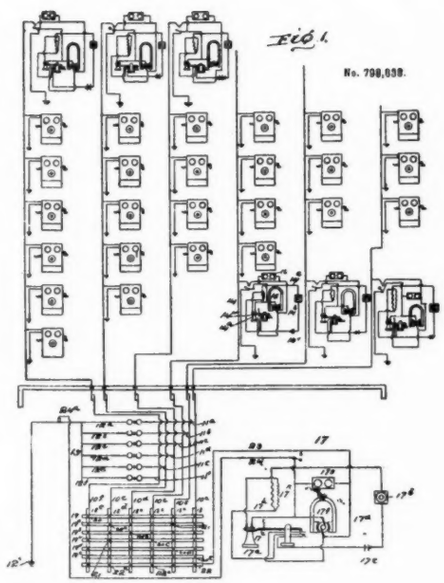
Mr. Boone hails from Peru, Indiana, and his invention has to do with a magnetic latch for the contact-springs of each subscriber's telephone of a party line. The lines are all supplied from a common battery, *C, B*, bridged across through impedance coils, and grounded as usual on the positive side. Each latch has its magnet of high resistance and connected in a ground tap from the sleeve or dry side of line. When any subscriber takes down his receiver, and thereby cuts his telephone across the metallic circuit, the potential of the sleeve side is raised owing to the resistance of the coil *S*, between it and the ground. Thereupon the grounded latch magnets at all the other stations take current and throw out their latches in the path of the con-

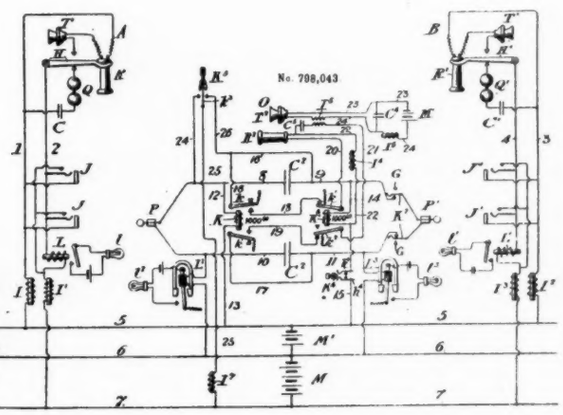












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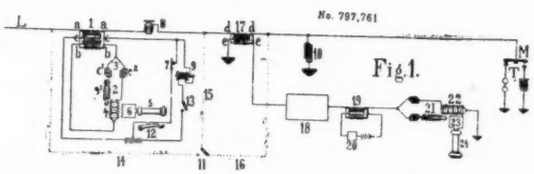
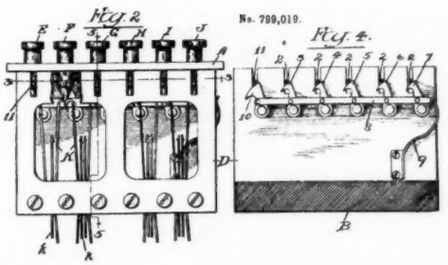




trolling springs of the switch-hook, thus locking all other stations, except the one that called.

If a second subscriber on the same line is wanted, the locking circuit is temporarily opened by means of key *P*.

798,659—C. C. Cadden and J. I. Gemmill. Annunciator.

This is a combined self-restoring drop and jack. The armature, *e*, is mounted on the front end of the magnet, between it and the face plate of the structure. The drop is held up by an under-hung hook lever *g*, and when the shutter falls its heel comes in front of a plunger-rod *i*, which is normally back, as shown, being controlled by a pivoted dog *k*, having an opening *n* and lying between the jack sleeve and springs. When a plug is inserted it must pass through the opening *n* and raise the dog perpendicular, thereby forcing out the plunger *i* and raising the shutter.

798,720—D. H. Wilson. Telephone Repeater.

This is another attempt at a much vexed subject. How it avoids reverberatory effects is not explained. Two lines come in from different stations and terminate in two secondary windings, *A'*, *B*, on a core *C*. Each end of this core has a diaphragm *D* and *E*, and opposite each diaphragm is a microphone *F* or *G*.. The microphones are connected in series with a battery *I* and a pair of primaries *H* and *H'*.

798,853—T. R. Welsh. Memorandum Attachment for Telephones.

This is a pressed metal rectangular frame like the desk calendar frame, holding a pad or note paper secured to a desk telephone by means of yoke of wire passing through one side of the frame and with nuts on its end screwing up against the other side.

799,010—O. M. Leich. Telephone Systems.

This patent has less than four pages of description, and has 23 pages of claims, there being altogether 142 claims. It is assigned one-third to the inventor, one-third to J. G. Ihmsen, and one-third to Max Zabel, of Chicago. The system described has been discussed for a number of years, and furnished a means of doing electrically what is otherwise done by tuning mechanically reed-clappers. In the diagram herewith there are four stations on the party line *5-6*, shown at *1*, *2*, *3* and *4*. At the first two the ringers *8-9* are in ground taps from the opposite sides of the line, said taps also including impedance coils *11* and condensers *12*, the latter being provided to prevent leakage of the battery current. At the stations *3* and *4* the ringers *13* and *14* are in parallel with coils *21* and *18*, forming a split ground tap from each side of the line, with condensers *12*. The magnet *18* when energized holds the end of the armature of the ringer to keep it from moving, and the choke coil *21* is wound so as to present high impedance. When an ordinary alternating current is impressed upon the circuit, the choke coil *21* forces it to pass through the ringer branch only, so the bells at stations *3* and *4* may be rung by such current, which, however, will not pass through the coils *11* at the other stations. To ring the bells at stations *1* and *2* the generator *22* at the central office is connected through the key s' or s^2, which includes the capacity c' *or* c^2, thereby changing the character of the current, or as the equivalent producing in combination with the coils *11* and *21* a circuit in which the current will flow, whence it will ring the bells *8* and *9*, but will be shunted around the bells *13* and *14*. Extraordinary efforts are made in the case to negative the idea of "tuning."

799,019—M. Setter. Telephone Switch.

This is a selective party line-ringing key, in which each plunger or button has a cross pin *2* which catches under a hood *3* when the button is depressed. The hooks are all joined by a bar *8*, and at the end is a releasing button *E* which has a pin *11* resting on a broad cam face *10* so that when this button is depressed it pushes back all the hooks to release all the other buttons, without catching itself. The patent is assigned to the American Electric Telephone Company.

799,137—J. A. Birsfield. Transmitter Arm.

This is really what is known in the trade as a hollow knuckle joint for transmitter arms. In one figure it is shown applied to a desk set, and in another figure of the patent it is shown applied to a transmitter on the front of a wall set. The underlying idea is very simple. It consists in a tube sticking up into a hollow in the ball of a ball-and-socket joint, a pin being driven through the ball and tube and fastening means being provided at the other end of the tube to anchor it onto the support. In the desk set, which is illustrated herewith, the tube *c* extends up through the neck of the socket *10* into the ball *3*, which has an opening large enough to give the required play to the transmitter, and which is stopped both ways against the tube. The pivot for the ball is shown at *23*, passing through it from side to side, and also through the upper end of the tube. The cord conductors pass from the transmitter back through the ball and down through the tube, the lower end of which receives a transverse pin or rivet *27*, the ends of which take into the top of the tubular standard, and form an anchorage. The design is very neat in this, that no joints are visible, or securing pins except the end of the pin *23*, the pin *27* being concealed by the kap carrying the socket, which screws down after the tube is in position.

799,146—M. S. Conner. Circuit Changing Apparatus.

This is a so-called combined relay, comprising a yoke *1*, two parallel cores *2* and *3* extending therefrom, a winding on each, the armatures *10* and *11* being pivoted on the yoke, and extending along the outside of the winding parallel with the cores into juxtaposition with extensions *4* and *5* or pole pieces, on the cores. The energization of magnet *9* permits the rod *20* to drop, closing the contact between the springs *18* and *19*, while the energization of magnet *8* pushes up the rod and breaks the contact.

799,160—C. M. Hedman. Switching Appliance for Telephone Exchanges.

This is a variation on the generally accepted form of ringing and listening key for operator's cord circuits. The cam *4* is pivoted at *5* and has two insulated studs *8* and *9* working on the ringing and listening springs *19* and *17* respectively. When pushed one way the stud *8* shifts the spring *19* to ring, but does not set in that position. When pushed the other way the stud *9* rides up further on the spring *7* than the other stud is permitted to ride, this being for listening purposes and the key then remaining in that position until disengaged. The different action of these two studs is secured by the unequal spacing of the limiting slot *11-12*, as clearly shown in the figure *5*. The fixed pin on the frame works in this slot.

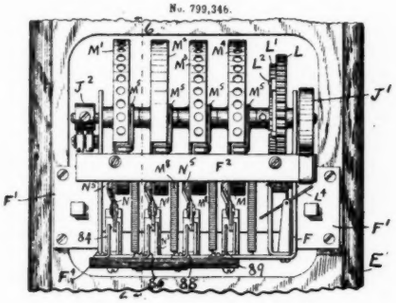
799,205—A. R. Thollander. Telephone Receiving Casing.

This receiver has a metal cup *7* like the Standard American Electric or North receivers, the cap clamping the diaphragm on the cup. The magnet structure is carried on a transverse bridge *15*, which extends from side to side of the neck of the cup, between the limbs of the magnet. The bottom of the cup is closed by a disk *10*, of metal, and one *11* of felt, to exclude air and moisture from the space within the cup.

799,346—F. A. Lundquist. Calling Device for Automatic Telephone Exchanges.

The invention in this case relates to the "sender" for an automatic exchange system having percentage switching.

No. 799,346.



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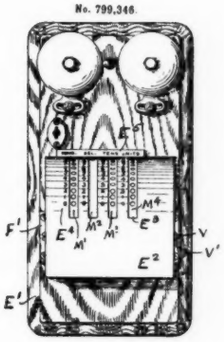

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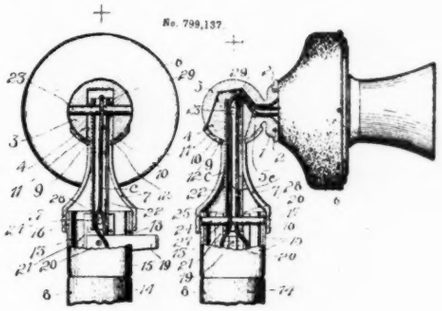

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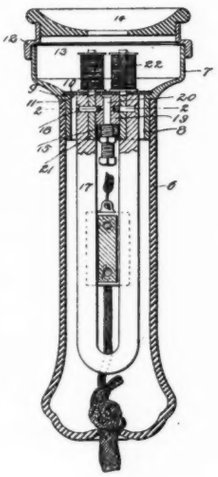
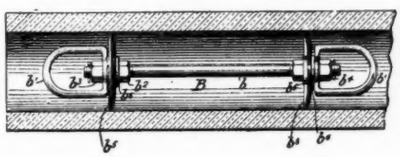
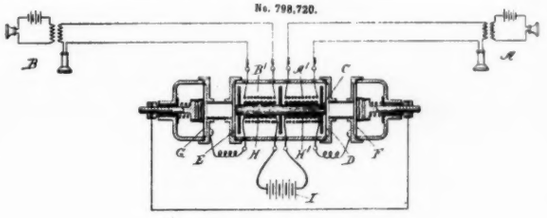


Fig. 1. No. 799,031.



No. 798,720.



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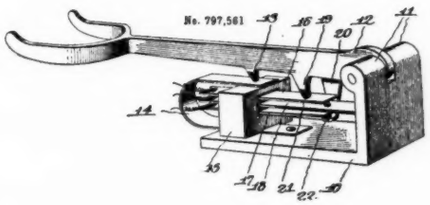


No. 798,035. Fig. 4

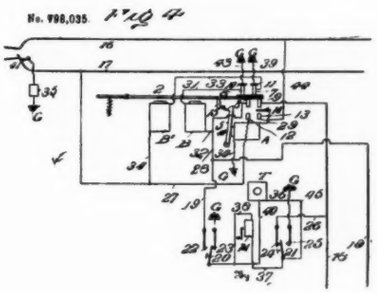
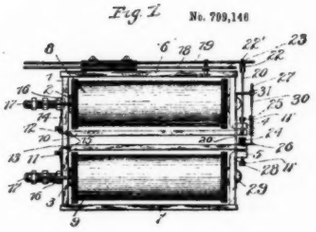


Fig. 2 No. 799,146



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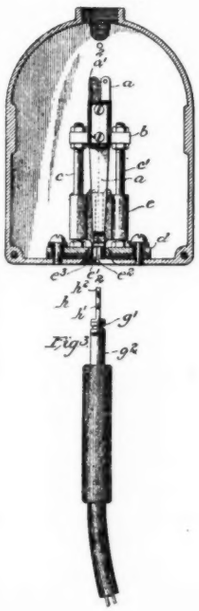
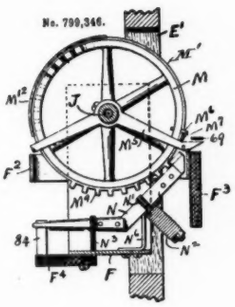
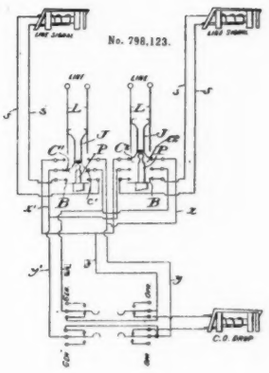


Fig. 3

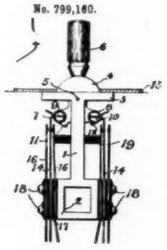
No. 799,346.



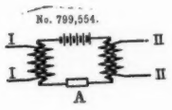
No. 798,123.



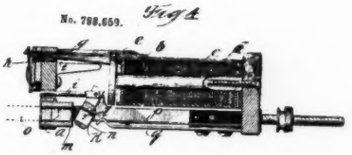
No. 799,160.



No. 799,554.



No. 798,659. Fig. 4



The device is mounted on the front of the telephone box in a metal casing E^2, having a curved top, slotted opposite each one of a series of wheels each of which has 10 holes for the reception of a plug V^2. Instead of putting your finger in the hole in the face of a wheel and turning it around until the finger strikes a stop, you stick the plug in the desired hole and turn the wheel with it until the plug strikes the edge of the slot at E^3. The details of contact springs, etc., are unnecessary to describe, but I may say that one spring answers for all the wheels, and the general circuit is described in an application of Lundquist filed August 21, 1900, Serial No. 27,549.

799,422—A. E. Waggoner. Watchman's Recording Alarm System.

This invention consists essentially in the combination of a watchman's clock, an operating circuit therefor, a recording device, a circuit to operate the same, and a series of stations at each of which is provided mechanism whereby both circuits will be operated simultaneously by the watchman, means for changing the rate of operation of the mechanism to indicate a telephone call, a telephone at the central office and in the recording circuit, and means for cutting a portable telephone into the circuit where by telephone communication may be temporarily established between any call box and the office, as occasion requires.

799,554—B. Gati. Telephone Relay.

Hitherto most attempts to affect telephonic relay or repeating have been by the use of electromagnetic or electromechanical means. Mr. Gati, who is an engineer of Budapest, in Ostra Hungra, used substances similar to the "ballast" used with Nernst lamps. He speaks also of gases, and refers to his former patent, No. 684,506, October 15, 1901. The simplest arrangement is that shown in the accompanying diagram, wherein *A* is a body whose resistance decreases when the strength of the current passing through the same increases. As the current induced in the local circuit by the telephone current passing through the transformer in line-wire *I* combines with the current flow through said local circuit, the strength of the latter current increases, while the resistance of the body *A* decreases in a corresponding manner. In consequence of such decrease of resistance, the current strength still further increases, and so on, the result of which will be that a current will be induced through the transformer in line wire *II* than is stronger than that coming from *I*.

Several more complicated arrangements are shown and claimed and for those who are interested in this branch of the art, the patents referred to will prove instructive as well as interesting reading.

A TELEPHONE CABLE IN LAKE COMO.

Bellagio is situated on the banks of Lake Como in Italy, and in order to connect up its telephone system with that of the places on the other side of the lake it became necessary to construct either a circuitous overhead telephone line or to lay a telephone cable under the lake. The former method would have been expensive, owing principally to the rocky nature of the ground to be covered, and so it was decided by the Como Co-operative Telephone Company to lay a cable from Bellagio to Cadenabbia under the lake, which is fairly narrow. Fig. 1 is a section through the cable, which is laid in deep water (about 460 ft. deep), while Fig. 2 illustrates the strengthened cables at the shore ends. The cable has two conductors. Each consists of seven tinned 0.55 mm. (0.0217 in.) copper wires, the copper section of each conductor, therefore, being 1.66 sq. mm. (0.00257 sq. in.). Each conductor thus formed is covered with three layers of gutta-percha, bringing the diameter up to 6 mm. (0.236 in.). Both conductors are then filled in and covered with hemp, so as to bring the diameter up to 17 mm. (0.67 in). On top of this are eighteen galvanized iron wires (2.5 mm. = 0.1 in. in diameter), covered by impermeable tape, tarred tape and finally "Clark" compound. The second armoring of the shore ends of the cable consists of eighteen galvanized iron wires 4.5 mm. (0.177 in.) in diameter, and the final covering is composed of two layers of tarred tape, the whole being well impregnated with "Clark" compound. According to the specification, the capacity of one conductor (the other being connected to earth) was not to exceed 0.306 mfd. per mile, the maximum resistance of the

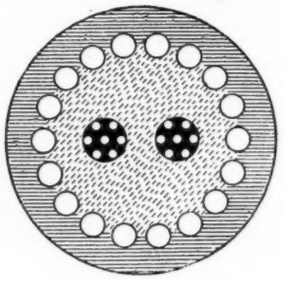


FIG. 1.

conductor at 15° C. was not to be more than 11 ohms per mile, and the insulation resistance between one conductor and the other conductor—which was to be earthed—was to be not less than 620 megohms per mile at a temperature of 24° C. On test, the capacity was measured and found to be 0.292 mfd. per mile, the ohmic resistance was found to be 10.2 ohms per mile at 15° C., while the insulation resistance came to 806 megohms per mile at 24° C. The length of cable required was determined by a direct measurement with a metallic rope, and the total length was found to be 1,830 m. (2,000 yds.), the cable being given a somewhat

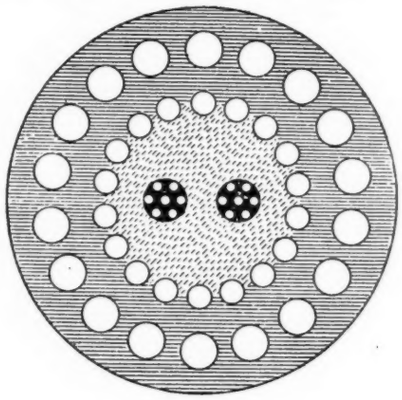


FIG. 2.

longer length, viz., 1,980 m. (2,160 yds.). The cable, which weighed some 9,250 lbs. altogether, was successfully laid, the metallic rope mentioned being reeled off at the same time as a check on the length of the cable paid out. It is stated in *L'Electricien*, from which these particulars are taken, that the telephone communication is very good over this short cable, and that it is easily possible to communicate with Turin, Milan and Sondrio.

While looking for "trouble," Home Telephone Company linemen ran into a swarm of bees housed in the cable box at the corner of East Main and Vine streets, says the Batavia (N. Y.) News. There was a short but decisive battle, from which the linemen came off victorious and the buzzy family was broken up. In the box were found several pounds of honey, which the men enjoyed. The comb was not of beeswax, but of paraffine, which the bees had extracted from the cable cup within the box.

Value of Independent Telephone Securities

O. F. BERRY

ELECTRICITY was made to use. It took us a long time to discover its value and uses. We have at last found out many of them, but none more helpful, more useful or more profitable than its use in connection with the telephone. Electricity is here to stay. The telephone is here to stay. Therefore, the telephone business is here to stay. It takes money to build and equip telephone lines and exchanges. In order to get this money some form of security must be made, and hence the issue of bonds or other form of securities by telephone companies becomes necessary.

The telephone business as compared with other public utility business is new. The telephone bond is a new paper, only recently presented to the commercial world. It is, in a large degree, an untried field. A business, like a man, must establish a character, must prove it is worthy of credit, and this cannot be done in a few days. Other large corporations or business enterprises have been years in creating a confidence in their ability to succeed, and while doing so not a few of what is now considered best failed. It was not always easy to sell many bonds now known as first-class. Telephone securities stand better to-day in the eyes of the commercial world than any securities of the same character that have not been longer upon the market, and they are growing in favor as fast or faster than any of the new class of securities put upon the market by the industrial world. We have no right to expect them to rank in public favor with securities of enterprises that have been in successful operation for from a quarter to half a century. We have just begun business, but we are in it to stay, to prove our ability to do business successfully, and thus show to the commercial world that our securities are worthy of consideration and a safe and profitable investment. There are a number of reasons why telephone securities were not for some time looked upon favorably, and in some instances why they are not now:

First: The telephone for some time after its invention was considered only a fad—something that was all right to prove certain scientific facts, but nothing that would prove of any practical value. This impression became fixed in the minds of many people some years ago and hence its value as a practical invention was not considered.

Second: When it was demonstrated that the telephone could be used for business purposes the patents on the telephone were of such a character, and controlled in such a manner, that the instruments were very high in price, and hence the service was so high that it was again considered that the telephone would only be used by the rich in the large cities. Thus, for another period its practical use or value in the ordinary affairs of life was not seriously considered, and for a long time the prices were so high that the cash received for service was sufficient, or at least should have been, to meet all needs, and no securities were offered or placed upon the market.

Third: When the original telephone patents expired, the early manufacturers placed upon the market very inferior and cheap equipment, which was due largely to lack of experience. This, together with the fact that the construction of the early plants was built by inexperienced men, resulted in inferior and unsatisfactory service, gave a high maintenance cost, a rapid depreciation in the plant, and increased the already existing belief that, as a practical and useful instrument, the telephone was not a success and that money in the business would be lost. These causes made some failures, naturally, were very discouraging to the operating companies and had a very detrimental effect upon Independent telephone securities. That time has now passed and a new state of facts prevail. The very best equipment can be secured from the Independent manufacturers, and this fact is well recognized. The methods of good construction having become familiar, plants can be and are built which are more substantial and have much less depreciation than the equipment used in almost any other class of business. This is due in a large degree to the fact that a very small per cent of the equipment of a telephone plant is subject to such mechanical motion as tends to wear out or deteriorate it.

Telephones as they are manufactured to-day have but few moving parts and are subject to very slight depreciation from wear, while the instruments of a few years ago were a constant source of expense. Instruments used to-day can practically be taken as complete, and it is not likely that there will be such a change in the future as will necessitate much, if any, expensive change. There is very little wear and tear on the telephone plant in comparison with most other lines of manufacturing industry.

Fourth: When the telephone began to come into common use many country lines were quickly and cheaply built and poorly equipped and many of them failed for reasons that are plain and easy to understand. They were built largely with the idea of local visiting in the country and for the amusement of the parties, little thought being given at the time that any real use or permanent value could come from the telephone. This also injured, not intentionally, but in fact, the value, or rather the proper idea, of the permanence of the telephone business or the permanent character of its securities. These facts, with some attempts to make large sums of money by organizing telephone companies and bonding them far beyond their value, have tended to injure the character of the telephone business and depreciate its securities.

These days are now past and to-day Independent telephone companies, as a rule, are building permanent plants. The people, almost as a whole, are convinced that the telephone business is a growing business and that it is becoming more permanent in its character every year. The demand to-day is largely for well-equipped exchanges and permanently built lines. This being, as I believe it is, the condition of the public mind and the attitude of the business world, it is now ready to listen to the presentation of our case, and while presenting it we get a respectful hearing and can generally, if we are entitled to it, get favorable consideration. Can we with the facts make such a case as will entitle us to the confidence and assistance of the investor? I believe we can, and to that end I now invite your attention. Some of the important elements to be considered in determining the value of securities issued by any kind of public utility are:

(1) The cost of maintenance. (2) The yearly depreciation. (3) The cost of operating. (4) The probable income. (5) The demand for and the permanency of the utility. (6) The stability of the income. (7) The people engaged in operating it.

With these elements before us, let us very briefly examine the question. Among the new enterprises is the interurban railroad. Its operation is subject to very rapid mechanical

Paper read before the convention of the Central Illinois Telephone Association at Peoria.

motion, which will produce a very high deteriorating effect on the property. For instance, the central station equipment, such as dynamos, motors, boilers, etc., which include practically the entire plant, is subject to this deteriorating influence. In addition, there are heavy maintenance charges —tracks to keep up and bridges to maintain. There is also a much greater financial risk, owing to damages to be paid on account of wrecks and accidents. Yet their securities are considered good, and in fact are generally much sought after. Applying the above tests, it does not rank in a single point with the telephone.

Again, comparing telephone properties with almost any manufacturing plant, we find the fire risk in manufacturing to be much greater than in telephone properties. The factory is located in one place, while the telephone property is scattered over a large area. In a telephone property, there is not the constant wear and tear on engines, machinery, etc., that there is in a manufacturing establishment. A telephone company is not compelled to carry a large amount of manufactured material which is constantly fluctuating in price. They are not subject to the fluctuations in price, stringency in the money market and business depression that is noticeable in almost all other lines of business. Once more, apply the above tests and the telephone has the advantage.

Again, the income of a railroad is materially affected by the crops of the country and its income from freights is almost entirely dependent upon this fact. Its passenger traffic is also materially affected by good or hard times, as we speak of them. The vast territory it covers and the manner in which it has to be operated, seem to me to make it less desirable than a telephone company.

So, with the income of all kinds of manufacturing plants, failure of crops, panic or strikes may cause them only to run part of the time, thus cutting off much of their income. Yet all of these, notwithstanding the difficulties pointed out, succeed and their securities are safe and sought after.

A crop failure would not materially affect the income or injure the business of the telephone company. A strike in a city that would stop all other kinds of business would not injure the telephone income. A panic that would stop all advance in many business lines would not stop the telephone exchange. The business or professional man may in hard times shut off the electric light or gas and go back to his oil lamp, but he will not shut off his telephone. We may not go off on a long railroad trip for our vacation, because business is not good, but we will continue to use and pay for the telephone—in fact, no matter how hard the times are or how widespread the business depression, the telephone is the last thing to be given up when it comes to cutting expenses.

We may stop our daily paper, and possibly our county paper, and do without the news, but we will keep and pay for our telephone and talk. We tell our wife and daughters that they must do without some new clothes, or a new hat, and while they will all agree to that, as a matter of economy, yet at the same time, we all agree that we cannot do without the telephone. The farmer must talk to his neighbor and thus save valuable time and money. He must telephone into town to the grocer, the implement dealer, the butcher and the merchant and order what he wants. He must call for the markets. He must make dates with the lawyer, fix his bank account with his banker, and find out from the blacksmith when he can have his horses shod or plow sharpened. He must talk to his son on the other farm, or in some other town. And whether in the city or country, the mother must talk to her daughter and the daughter must talk to her mother. John must talk to Mary and Mary must talk to John. We must telephone the doctor when we are sick and the doctor must have a telephone, so we can telephone him. So we often wish to telephone the minister and lawyer and they must have telephones so we can telephone them. The housewife must telephone the butcher, the grocer, the baker, the dry goods merchant, the hardware man, the carpet man, the dressmaker and the milliner, besides arranging all her social and church duties by telephone.

It is sometimes stated by persons who are not well informed, that telephone securities are not tangible, that they are more of a chattel nature. Of a modern telephone plant, constructed after the most improved ideas, this is probably less true than it is of the securities of any other public serving utility. The system is more permanent, less liable to deterioration through mechanical motion, and when discarded there is probably a greater salvage obtained than from almost any other kind of an operting plant. A large per cent of the cost of a telephone system is included in the wire and cable plant, which is composed almost totally of lead and copper, and which when discarded will sell at a very fair per cent of the original cost.

The illustrations already used, and many more that could be, including electric light plants, gas and water plants and others, show that the cost of maintenance of a telephone system is less than either of the others in proportion to the amount of money invested, while the yearly depreciation, on account of the reasons already given, is less.

While it may take, according to the money invested, more persons to operate a telephone system, comparatively few of them are high-priced as the help used in any of the other utilities, and hence it makes the operating as a whole less in proportion. The income, even at present rates, is fair, and it is an easy matter to see that with better service, which is constantly being given, the income can be increased. The demand for, and the permanency of the telephone system, are superior in our judgment to either of the other utilities.

In the manner of transportation, considerable change has been and is liable to be made, while both electric lights and gas are being superseded in many instances by other lighting. The stability of the income is insured for the reason that the demand is increasing and will continue to increase for the telephone. Its general use also insures the stability of the income, as well as the fact that it is now, or soon will be, used practically by all of the people, and in this particular it is superior to almost any other public utility.

With these facts before us (and any student of the present situation must conclude that these statements are reliable), it seems that there is nothing but the most encouraging outlook for telephone securities. And all these people I have spoken of must have telephones, so that all others may communicate with them, and also so that they can communicate with each other. The lawyer transacts a large amount of his business to-day over his telephone. The physician prescribes for his patient and keeps in close touch with every case by the use of his telephone. We never leave home for the train without going to our telephone and inquiring if the train is on time. We do not wait at depots any more for trains. The farmer every evening listens to the weather report for the next day and arranges his work accordingly. In short, the people are kept in constant and close touch with each other by the use of the telephone to-day, as never before, and it is one of the most important factors in the business, commercial, political, religious and social world. Its use is permanent and fixed. Again, it will remain and continue to grow in the future, for the further reason that it can be furnished to the people and all the people for such a price as almost any family can afford. The workingman can save enough time every month by its use to more than pay the rent. The one fact that the telephone is now, or soon will be, used by all the people; that the service is of a permanent character and can be furnished at such a price that all classes can use it, and at the same time make fair profits for its investors, alone makes telephone securities among the most staple and desirable.

Telephone Tales Tersely Told

The Toledo (Ohio) Home Telephone Company is preparing to erect a new three-story building.

The Napa (Cal.) Telephone Company expects to expend about $10,000 in the improvement of its system.

The Iola (Kan.) Telephone Company contemplates improvements to cost in the neighborhood of $25,000.

The Home Telephone Company of Los Angeles has 17,000 telephones in operation and 3,000 on its waiting list.

The Utah Independent Telephone Company has been granted a thirty-year franchise by the city council of Provo, Utah.

The New Ulm (Minn.) Rural Telephone Company contemplates expending $50,000 in building rural lines in Brown and Nicollet counties.

The United States Telephone Company is preparing to rebuild and remodel its plant at Cedar Rapids, Iowa, at an outlay of $400,000.

A private exchange, furnished by the Utah Independent Telephone Company, is being set up in the Knutsford Hotel at Salt Lake City.

The Home Telephone Company of Fullerton, California, will expend about $40,000 in improvements in connection with the new exchange to be installed there at once.

Automatic telephones have been installed in the city schools of Champaign, Illinois, also switchboards, so it is possible to connect with any of the buildings without calling central.

The Interurban Telephone Company of La Crosse, Wisconsin, has purchased the Star Telephone System, including over 200 miles of line through Vernon, Crawford, and Richmond counties.

Lane's Landing and Dahl Creek, two most important points in the Kougarak district, Alaska, have been brought into telephonic communication with Nome. Several extensions will be made connecting the mines on the various creeks.

Attorney William Thomas, in behalf of the Home Telephone Company of Alameda county, California, has made formal application for a franchise for the installation of a telephone system in Oakland, across the bay from San Francisco.

The Mississippi Valley Telephone Company is to make $80,000 worth of improvements at Burlington, Iowa, this fall. A building is to be purchased, in which a new exchange will be installed, and all the downtown wires will be put underground.

As a result of the refusal of the Sunset Telephone Company to accept a franchise passed by the city council of Tacoma, Washington, and put up a guarantee of $5,000, the application of E. Elbebster of Seattle for a franchise in Tacoma will be granted.

The Holyoke (Colo.) Telephone Company will extend its lines. This system started three years ago with a small exchange and when the extensions are completed the system will have connection with over 400 miles of service, covering almost the entire county.

At a recent meeting of the executive board of the Illinois Telephone Company the general manager was instructed to purchase the necessary poles and equipments to rebuild the exchanges at Greenfield and Roodhouse, which will mean an expenditure of nearly $15,000.

The demand for additional service in the Jasper County (Iowa) Telephone Company is so great that it will be necessary for the company to increase its capacity, which will be done at once. The Newton exchange has 1,197 telephones in service and the Colfax exchange 275.

Monmouth, Illinois, boasts of a prosperous telephone exchange. There are at present no less than 3,000 instruments in Warren county, in which Monmouth is situated. The Monmouth exchange serves 1,200 lines. Fourteen operators and six men are required to care for the company's subscribers.

Council Bluffs, Iowa, will not have an automatic telephone exchange. The directors of the Independent Telephone Company of that city have decided to adopt the manual system of making connections in the central office, and the contract for the switchboard and electrical equipment has been let.

The Athens County (Ohio) Telephone Company has been reorganized and hereafter will be known as the Athens County Home Telephone Company. The purpose of the reorganization is to enlarge the plant and extend and improve the service in the county. The capital stock of the new company is $100,000.

The Rockford and Interurban Long-Distance Telephone Company of Rockford, Illinois, recently incorporated, will construct a line connecting all the cities along the lines of the interurban companies centering in Rockford, and exchanges will be established in each place, the work of construction already having begun.

James T. Carbin, the pioneer Independent telephone promoter of northern Ohio, has sold the Bloomville plant and sixty-five miles of toll lines extending to Griffin, Bucyrus, Shelby and Republic to the Farmers' Telephone Company for $15,000. Some time since he sold the Republic exchange to the same company for $6,000.

The American Independent Telephone Company at Burlingame, Kansas, has sold its exchange to a company of local business men. Consideration, $14,000. Mr. Stine, who has had charge of the plant for some time, will continue as manager. The company contemplates many improvements and the betterment of the exchange in general.

The Commercial Telephone Company of Austin, Texas, is to be reorgnized by J. A. Quisenberry of Danville, Kentucky, J. H. Goeke of Wapakoneta, Ohio, and F. Bimel of Portland, Indiana, who have paid $100,000 for the telephone properties. It is said they will increase capital stock to $500,000 and extend the lines and improve the exchanges.

Gloversville, New York, is to have a new Independent telephone company. A canvass for subscribers was lately commenced, and it is the intention of the new company to form an organization and install a modern plant for the cities of Johnstown and Gloversville. Le Roy W. Stanton, the electrical telephone engineer of Cleveland, Ohio, is promoting the project.

Reports read at the annual meeting of the Co-operative Telephone Company of Rushville, Indiana, showed the past year to have been a very prosperous one. The company made additions costing $9,240 and still decreased its debt. The present indebtedness of the company is $18,200. The local exchange has 805 telephones in service; the Manila exchange has 151.

The city council of Hattiesburg, Mississippi, has granted a franchise to J. A. and S. A. Jones and George D. Winter of Chicago to build an underground telephone system, at a cost of $125,000. The franchise is to run for twenty-five years, and work is to begin in thirty days. A bond of $5,000 was deposited to guarantee the completion of the work.

In a short time an interesting document will appear from the pen of Frederick S. Dickson, president of the Cuyahoga Telephone Company of Cleveland. He has written a pamphlet on the value of telephone securities, which is in the hands of the printer. It promises to be one of the most complete and exhaustive treatises on the subject that has yet been issued.

J. C. Monteith, representing E. L. Barber & Company, recently purchased 201 shares of reserved stock of the Henderson (Ky.) Telephone and Telegraph Company at the par value of $50. This purchase gives control to the minority stockholders with 374 shares. The company proposes to put in a new central energy switchboard and make other extensive improvements.

At a special election held in Spokane, Washington, on the question of granting a franchise to the Home Telephone Company, the people, by a vote of 2,545 to 390, decided in favor of granting the franchise. Immediately following the announcement of the result the Home company signified its acceptance of the franchise and filed its bond in the sum of $10,000, as required by the ordinance.

A new telephone company is desirous of invading Alameda, California, and to that end has filed an application for a franchise with the city clerk. The company guarantees, in its application, to spend $80,000 within the next two years and to pay 2 per cent of its gross earnings to the city after five years from the date of the granting of the franchise. The application is signed by P. Kerr Higgins.

The directors of the Rural Telephone Company of Milbank, South Dakota, have let contracts for construction and materials for 100 miles of the latest improved telephone line. The main lines will run from Milbank to Twin Brooks, from there south to Stockholm and north to Corona. A line will run from Milbank to Big Stone and from Milbank to Albee and Revillo. Branches will be run from these lines.

By the use of a telephone the family of Frank G. Sanders, consisting of seven persons, was saved from instant death in a cyclone which swept the vicinity of Winona, Minnesota, recently. The Sanderses were eating dinner when their telephone rang. A. McConoche, a neighbor, stated that a funnel-shaped cloud was sweeping toward their house. The entire family rushed to a nearby clump of willows, where they lay face downward. They

had scarcely reached their place of safety before the storm struck the house. The structure was lifted from its foundation and dashed to the ground a few feet away, with hardly a board left unbroken.

The William H. Kelley telephone exchange of Williamson, New York, has become a part of the Wayne-Monroe Telephone System. The exchange is a very valuable one, thousands of dollars having recently been invested in the property. The capital stock is now $100,000 and the last quarterly dividend amounted to 1½ per cent. John A. Driscoll of Rochester has been made president and general manager for the coming year.

The Princeton (Ind.) Home Telephone Company has decided to connect with Patoka, a town of 700, and adiacent territory direct, and do away with an exchange at Patoka. Work on the extension of the Princeton line to connect with the Independent plant at Mt. Carmel, Illinois, is progressing speedily. The Princeton company will move into a new exchange building, which it has leased for fifty years, and install a new switchboard.

The Independent Securities Company, controlled by the Rochester (N. Y.) Telephone Company, which has also merged the Syracuse and Columbia long-distance companies, has purchased the Rome Independent Telephone Company, with its sixty miles of toll lines and 1,300 telephones in service, for $150,000. This gives the Rochester interests a continuous line from Rochester, to Little Falls and Oneida. A new exchange will be built at Syracuse.

At a recent meeting of the Petroleum Telephone Company, held at Oil City, Pennsylvania, a resolution was adopted authorizing the expenditure of a considerable sum for new cables and extensions to the service of the company in Titusville. The company has 600 telephones in service in Titusville, 1,040 in Oil City, 735 in Franklin, and forty-five in Pleasantville, making a total of 2,420, which the company expects to make at least 3,000 within a very short time.

The Ft. Wayne (Ind.) Home Telephone Company has just issued a new directory, which contains the names and numbers of 3,300 subscribers in the city, 136 on country roads and fifty-two at New Haven. The company now gives service to the farmers in every direction from the city, there being telephone lines on the Bluffton, Coldwater, Goshen, Hayden, Huntington, Hicksville, Illinois, Leesburg, Leo, Lima, New Haven, Maysville, Piqua, Winchester, Griswold and Wayne Trace roads.

The injunction suit of the city of Hamilton, Ohio, against the Hamilton Gas and Electric Light Company and the Home Telephone Company has been decided against the city by Judge Belden. The suit was brought to restrain the electric light company from stringing wires on the poles of the Home Telephone Company, but the court held that an agreement between the two companies, which lessened the number of unsightly poles erected on the streets, was a public benefaction instead of an injury to the city.

The telephone companies that have been operating in the southern part of Nevada have been consolidated, a new corporation, called the Tonopah, Goldfield, Bullfrog & Las Vegas Telephone Company, taking over the properties of the Goldfield and Tonopah, the Sodaville and Tonopah, and the Goldfield and Bullfrog companies. The new company is incorporated under the laws of Montana and is backed by the wealthiest mining men in the camps. It will at once extend its lines to Las Vegas and other distant camps.

There is strong talk of the organization of a home telephone company in Dickson county, Tennessee. The Cumberland company, which is now operating in that field, charges prohibitive rates and refuses to build lines in the county unless the people provide the material and help construct them, and then pay two prices as telephone rent. This has incited the farmers to action, and if the Cumberland company does not show a more liberal spirit toward the rural districts of the county, doubtless a new company will be in the field within the next few months.

The Ellis County (Texas) Independent Telephone Company has now direct connection with Hillsboro, Waco, Houston, Austin, San Antonio, and other south Texas points. A long-distance line connecting Waxahachie with Waco was completed recently. The Independent has had connection with Corsicana two or three years. Material has been purchased for the construction of a line between Waxahachie and Fort Worth. When this line is built the long-distance service will then be complete to St. Louis. This company has made several unsuccessful efforts to get into Dallas, and it yet hopes to establish a system in that city within the next year or two.

Four branches of the Home Telephone Company were incorporated August 17, the branches being those for Oakland, San Jose, Fresno and Stockton, California. The capital stock of the Oakland branch is placed at $3,000,000, with $30,000 subscribed. The San Jose branch has a capital stock of $2,000,000, with $30,000 subscribed; the Stockton branch has a capital stock of $1,500,000, with $20,000 subscribed; and the Fresno branch a capital stock of $2,000,000, with $30,000 subscribed. The directors of the Oakland branch are: L. Webster, J. E. Schoenfeld, J. Robinson, William Thomas, William L. Gerstle, Thomas S. Parkhurst, Jr., and L. S. Ackerman. With the exception of Gerstle and Webster, the same persons constitute the directorate of the other branches.

Personal

Ed. Givens will install a telephone system at Castleton, Kansas.

J. J. Shepperd has installed a new telephone exchange at Ozona, Texas.

John Wilson of Denson Springs, Texas, has purchased the Elkhart telephone system.

C. B. Hull has been appointed manager of the McComb (Ohio) Home Telephone Company.

L. O. Surles will build an exchange for the Chipley (Ga.) Mutual Telephone Company.

H. B. Lemon has purchased the telephone company recently organized at Perry, Michigan.

Stone & Ginn have succeeded to the telephone business of Wall & Head in Edgerton, Missouri.

H. T. Feasel has purchased the telephone business of W. W. Finney at Neosho Falls, Kansas.

Judge C. H. Willingham has been granted a fifteen year telephone franchise at Ballinger, Texas.

A. S. Adams has been appointed manager for the Home Telephone Company at Joplin, Missouri.

T. B. Huff has been appointed manager of the local telephone company at Drayton, North Dakota.

Charles Estle has been granted a franchise for a telephone exchange at Columbus Junction, Iowa.

W. E. Showen has been appointed manager for the Mutual Telephone Company of Waterloo, Iowa.

Ralph Haven has been appointed cashier of the Home Telephone Company at San Bernardino, California.

George H. Wilder has been appointed manager for the Citizens' Telephone Company at Akron, New York.

William Mooney has been appointed manager of the telephone exchange at Orland, Cook county, Illinois.

L. O. Pillsbury has been appointed manager for the Midland Telephone Company of Spring Lake, Iowa.

Fred L. Thomas has been appointed manager of the Union Telephone Company at Greensburg, Indiana.

M. Fretz has been appointed manager of the Harlan and Avoca (Iowa) Telephone and Telegraph Company.

J. W. Booth and R. S. Anderson of Rugby, North Dakota, will install a local telephone system at Sherwood.

J. B. Pierce will act as general manager of the Independent Telephone Company of Syracuse, New York.

J. E. Harris and others of Amherst, Kansas, have organized the Independent Telephone Company of Amherst.

M. C. Canfield has been appointed manager of the Northern Ohio Telephone Company of Perrysburg, Ohio.

H. Jaehning has sold the New Richland, Minnesota, telephone exchange to Milo Hodgkins, formerly of Waseca.

J. W. Kyle has been appointed manager for Jefferson county, West Virginia, of the United Telephone Company.

H. T. Liter of Blackburn, Missouri, has sold his telephone exchange to the Sweet Springs Telephone Company.

James Hedley is soliciting funds for the construction of a rural telephone line in the vicinity of Crookston, Minnesota.

Elmer Harding has been appointed manager of the local exchange of the Chariton (Iowa) Telephone Company.

E. V. Vaughn and others have been granted an Independent telephone franchise by the city council at Jerseyville, Illinois.

D. E. Mann has succeeded Jason Van Vors as manager of the Buchanan County Telephone Company at Lamont, Iowa.

W. A. Matteson, formerly owner of the telephone exchange at Cherryvale, Kansas, has disposed of the same for $25,000.

Mack Hammett has succeeded George W. Buchanan, resigned, as manager of the Pine Bluff (Ark.) Telephone Company.

O. A. Farley has been elected secretary of the Lebanon (N. J.) Telephone Company to succeed G. W. B. Tiffany, resigned.

Matt Durham has been appointed manager of the Independent Telephone Company at Belton, Texas, to succeed Dick Nelson.

William Bedell has been appointed district manager for the Central New York Telephone Company in Syracuse, New York.

J. H. Schwahn, manager of the Osage City (Kan.) Telephone

Company, will shortly begin the erection of a substantial addition to the exchange building.

O. W. Reid has been appointed manager for the Southwestern Telephone and Telegraph Company at Walnut Ridge, Arkansas.

H. L. Harris, wire chief of the Sandusky (Ohio) Telephone Company, recently spent several weeks in the east on a vacation.

Lee Boyd of Higginsville, Missouri, is superintending the construction of forty miles of farm lines in the vicinity of that place.

D. C. Bell has resigned as manager of the Union Telephone Company of Bonaparte, Iowa, and A. V. Buck has succeeded him.

R. A. Walker has accepted the position of general manager of the Central Iowa Telephone Company, with headquarters at Iowa Falls.

J. E. Frisby, formerly manager of the Lonoke (Ark.) Telephone Company, has taken charge of the Waldon (I. T.) Telephone Company.

Horace Ellet has succeeded C. E. Jones as president of the Fluvanna (Va.) Telephone Company. Mr. Jones becomes general manager.

B. F. Petty of Boonville, Missouri, recently arranged for the construction of two farm lines running out of Prairie Home, Missouri.

Leo Griffith has been appointed manager of the Union Telephone Company of Newcastle, Pennsylvania, succeeding W. B. Thomas.

R. A. Aiken, Dr. Joseph Lutton, J. H. Boyd and others have organized an Independent telephone company at New Castle, Pennsylvania.

A. B. Bickford, T. O. Hunter and A. C. Wiper have been granted a franchise at Bowbells, North Dakota, for a telephone exchange.

J. A. Wynes of Davenport, Iowa, has accepted the position of manager with the Seward County Telephone Company of Seward, Nebraska.

John M. Lain, M. D. Sprout, O. S. Reed and Henry Utt have purchased the telephone line which extends from Steckel to Shunem, Iowa.

Rust Brothers of San Angelo, Texas, are engaged in equipping the telephone exchanges in the towns of Robert Lee and Sterling City, Texas.

John Rosenburg has been appointed manager of the Farmers' Mutual Telephone Company of Vinton, Iowa, to succeed George Urice, resigned.

E. H. Van Cor, for years manager of the Citizens' Telephone Company of Morrisville, Vermont, has purchased a controlling interest in the same.

John Admire, formerly with the Austin (Mo.) Inland Telephone Company of Amsterdam, has taken charge of the exchanges at Archie and Austin.

John E. Frazier of Elmira, New York, has been appointed manager for the Empire State Telephone and Telegraph Company at Auburn, New York.

G. C. Carpenter of Findlay, Ohio, has been appointed manager of the local telephone company at Jacksonville, Illinois, to succeed J. P. Brown, resigned.

L. W. Prentice, superintendent of the Clinton (Iowa) exchange of the Tri-City Telephone Company, is traveling in the far west for the benefit of his health.

Messrs. E. M. Eglehart and Ira Butterfield of the Malta Bend (Mo.) Telephone Company, have secured a franchise to establish an exchange at Miami, Missouri.

F. E. Bell has been canvassing the situation at Concordia, Kansas, with a view to submitting an estimate of the cost of putting the telephone wires underground.

Oscar O. Ayers has sold to F. R. Ogg, an attorney of Olathe, Kansas, and M. G. Miller, owner of the Bank of Olathe, the Citizens' Telephone Company for $35,000.

Thomas Lowe and William Rice, who recently purchased the Jasper (Mo.) telephone system, have taken charge of the business and will give the plant a general overhauling.

J. Evans of Santa Ana, Texas, has purchased the Miles telephone exchange. The new owner will take possession at once and will improve the plant and add to it considerably.

J. H. Milling of Rock Hill, South Carolina, and W. S. Percival of Ogden and associates are organizing a company to construct and operate a telephone system from Rock Hill to Ogden.

R. A. Nix is putting in a telephone exchange at Montague, Texas. He will also have charge of the long-distance lines to Nocona and Bowie, and the local lines running to Mallard and Dye.

John A. Duncan, formerly assistant general manager of the Ft. Wayne (Ind.) Independent Telephone Company, has entered upon his duties as superintendent of the new telephone system at Sioux City, Iowa.

Charles E. Hotle of Sebastopol, California, is interested in the promotion of a telephone line to connect Sebastopol with Green Valley and the country lying north and west of the latter.

J. H. Schwalm of the Osage City (Kan.) Telephone Company has purchased the Lyndon telephone system and fourteen miles of toll lines, and will at once overhaul and improve the same.

Thomas Rodgers has been appointed inspector of telegraphs and telephone of the Grand Trunk, with supervision over all lines east of Detroit and St. Claire rivers, headquarters in Montreal.

E. H. Davenport, an old telephone man, who has lately been connected with the Norwalk (Ohio) Evening Herald, has gone to Columbia City, Indiana, to take the position of manager of the Whitley County Telephone Company, an Independent system with several exchanges.

A. T. Presson, secretary and treasurer of the Johnson County Telephone Company of Iowa City, Iowa, states that the information regarding the company having gone into the hands of a receiver is false; that the company is solvent and in the most flourishing condition of its history.

Rev. William Mullendore, who has been manager of the Franklin (Ind.) Telephone Company for the past two years, has sold his interest to Louis Holweg of the New Telephone Company of Indianapolis. Frank and Victor Smith have also sold the greater part of their interest in the business to Mr. Holweg.

Warren H. Girvin, general superintendent of the Central New York Telephone and Telegraph Company and the Empire State Telephone and Telegraph Company, has tendered his resignation. W. W. Nicholson, who has been assistant general manager of the company, with headquarters at Utica, will succeed Mr. Girvin as general superintendent, and the office of assistant general manager, it is said, will be abolished.

C. R. Langley, for several years manager of the Munising Telephone and Electric Company of Munising, Michigan, has disposed of his interest in that company, and is now superintending the construction of a new teelphone exchange at Grand Marais, Michigan, it being his intention to make a specialty of this branch of work in the future. He expects to have the Grand Marais exchange completed on or before October 1.

C. E. Stinson, manager of construction, operation and maintenance of the Toledo (Ohio) Home Telephone Company, has resigned his position and returned to his old home in Buffalo, New York. Mr. Stinson is one of the best known telephone men in the middle west, having been in the business about twenty years. He will take a rest of several months with friends in Buffalo, after which he will assume managerial charge of the Rochester (N. Y.) Telephone Company. Mr. Stinson's successor in Toledo has not yet been named.

A. H. Bastin of the Bastin Telephone Company of Lancaster, Kentucky, the Fayette Home Telephone Company of Lexington, Kentucky, and John Woodward of the Camp Ground Telephone Company and lessee of the London and Manchester lines, have entered an agreement to build a first-class copper circuit from Lexington to Jellico, Tennessee, 201 miles southeast of Louisville, Kentucky. There are two gaps of pole line of twenty-eight and fifteen miles to be built, besides the reconstruction of a large portion of the present pole line. Active work has been begun on the Jellico division to Barbourville and on two other divisions between the latter place and Lexington, Kentucky. At Jellico connection will be made with the Knoxville Independent people, who already have copper lines into Jellico.

WHAT THE TELEPHONE DOES.

It saves you time in a thousand ways,
  And time is money, you know;
It does your shopping on frozen days,
  When the winds of winter blow.
And if, when your orders are sent, you find
  Your wishes and wants have grown,
Or you'd like a change in measure or kind,
You can change your list when you change your mind,
  By the use of the telephone.

You reserve your berth in the Pullman car
  And your seats at the matinee;
You call your friends from near and far
  For a feast or a holiday.
And if any accident should befall
  You can easily make it known
To the guests you have bidden, one and all,
And save all trouble by making a call
  Through your friend—the telephone.

Manufacturers' Department

A NEW DEPARTURE IN CENTRAL ENERGY TELEPHONES.

A few years ago it was grudgingly conceded by the best telephone engineers that common battery or centralized energy systems would probably in time supersede all others for large installations, but for a long time it did not appear that convenience and economy would be served in the small exchange by these systems. Times change, and we change with them; it is of course unnecessary to speak of present universality of common battery as distinguished from the old magneto systems. The question to-day, in small exchanges as well as large, is not, "Shall we use common battery?" but what is the best central energy outfit. There is a tendency which has been strongly perceptible for some time past to favor what may be called compact central energy telephones. In the desk sets this means merely that the bell box is considerably reduced in size, or dispensed with entirely, and the ringer associated with the desk standard, being housed in its base. In a wall set, however, the designer has been confronted with a difference problem. One solution of this problem, which is claimed by the manufacturer to be among the best, if not the best, that has so far been offered, is put forward by the Egan Electric and Telephone Manufacturing Company of Petersburg, Illinois. The designs are due to Charles E. Egan, who has been well known to all Independent telephone men for many years, the Egan company having been recently organized for the purpose of taking over and handling commercially the best and latest of Mr. Egan's many inventions.

FIG. 1.

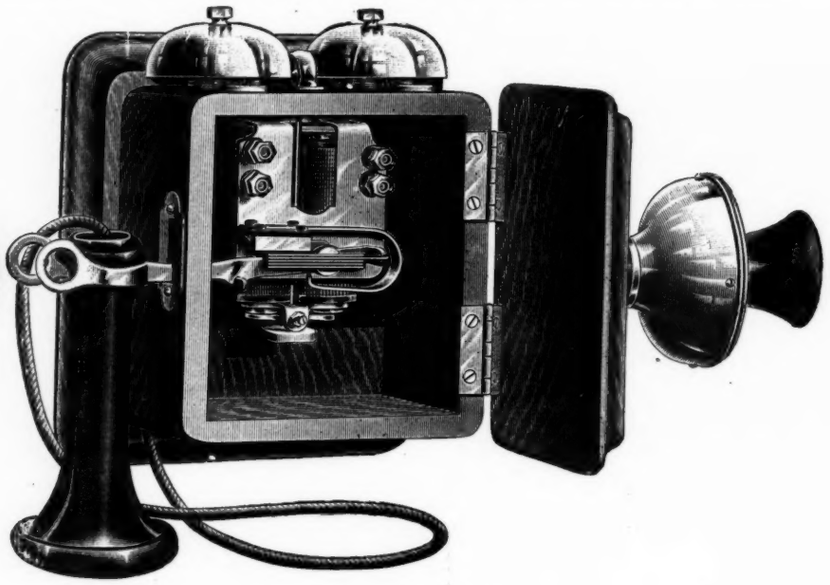


FIG. 2.

There are several novel features involved in the Egan Compact Common Battery Telephone, of which four cuts are given herewith. In the first of these (Fig. 1) the box is shown closed, the transmitter being mounted upon a short knuckle joint upon the front. The second cut (Fig. 2) shows the box open, exposing the working parts which are all mounted as a complete unit upon one frame, shown in the third cut (Fig. 3) as removable from the box. This structure includes the ringer, condenser, switchhook and impedance coil, and in its preferred form also includes mountings for the gong posts. In the cut these are shown secured to the outside of the box. The ringer has very long cores, one of which carries the winding, and the other carries a rolled condenser of peculiar construction, the material and method employed being held a secret by Mr. Egan. This condenser has a very high capacity for its size, and when the usual binder's cloth and other covering is applied the two spools of the ringer are not noticeably different from the windings in an ordinary instrument. Thus the condenser is combined with the ringer itself, and as will be noted from the diagram (Fig. 4) the winding side of the ringer is also employed as the impedance coil. In winding this coil, which may be of any desired resistance up to 1,000 ohms or more, the wire is laid on until thirty-five or forty ohms have been wound, when a double end or loop is brought out, and the further winding proceeded with. This loop is then connected in the transmitter circuit. The ringer yoke carries a plate which drops down in front of the spools and carries a self-contained long lever switchhook, the lever being removable so as to permit the set to be shipped in a very small case.

Referring to the diagram, it will be seen that the circuit is designed so as to be usable with any of the standard common battery line and switchboard circuits. The battery supply is from the line post to the outside of the ringer winding to the tap, to the transmitter, to the switchhook, and so back to line. The receiver and the condenser side of the ringer are connected in shunt around a portion of the ringer winding when the hook is up, and in series with the whole winding at other times. When the hook is down a short circuit is established about the receiver in order to prevent ringing current from passing through it.

The wiring of this set is very simple, and the mechanical construction is excellent. As all the parts are of standard construction and type, and the circuit itself is an improvement in a modification of circuits which have been thoroughly tried out, the instrument may safely be accepted as fulfilling the requirements of good engineering practice.

This being so, the company expects to do a very large business, and reports that it has already received inquiries looking to orders from many quarters, although no regular advertising has yet been done. One reason for this is that owing to the simplicity of the instrument the company expects to make interesting prices, and another is that sets of this character can be used to advantage in many places where the older type of wall sets with long backboards and projecting arms cannot be accommodated. While well

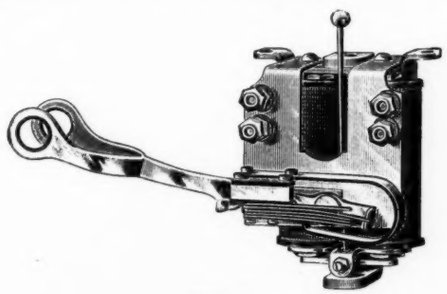


FIG. 3.

adapted for use in hotels, business offices, and in interior systems generally, these instruments are regulation long-distance telephones, with full standard equipment in respect to receiver, transmitter and other working parts. The Egan company contends that the telephone instrument of the future will be much simpler and smaller than its early predecessors and upon faith in this contention they are increasing their investment, which is already considerable, so that their equipment will be sufficient to handle a very large amount of business.

It is confidently asserted by the company that questions of infringement cannot arise in connection with their telephones, for the reason that they have followed the best legal and technical advice to be had both as to patent matters and as to matters within the company. Regarding pro-

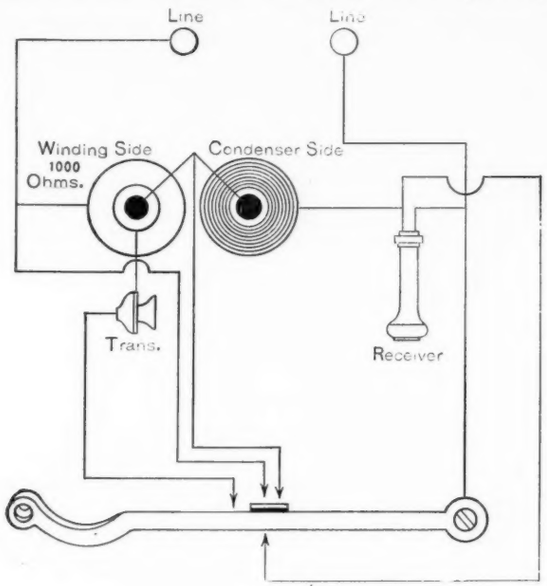


FIG. 4.

tection against infringement, the company is the owner of all of Mr. Egan's United States patents, covering the foregoing type of telephones as well as others, and also of patents in many foreign countries for the same.

PREMIER ELECTRIC COMPANY.

The Premier Electric Company, composed of well-known and experienced Chicagoans, was organized during the month of August, and having bought the braiding plant of the McDermid Manufacturing Company, at 118-132 W. Jackson boulevard, that city, will continue the manufacture of the well-known Premier B B switchboard cord. Other varieties of cords employed in the telephone and electrical fields, such as receiver cords, desk set cords, yardage cords, etc., will also be manufactured upon an extensive scale, and correspondence pertaining to such items is cordially invited. W. J. Burton, vice-president and manager of the new company, is the inventor of the Premier B B switchboard cord and has had several years' experience in the manufacture of telephone cords, and, being a man of experience in this line, it may safely be predicted that he will do his level best to please all patrons.

THE LONG DISTANCE TELEPHONE SALES CO.

The Long Distance Telephone Sales Company, a new incorporation, has entered the Independent telephone field with the object of supplying a superior line of telephone apparatus, and placing in the hands of exchange managers

C. K. SEIBERT. S. A. DUVALL.

and other buyers telephones built upon correct scientific principles.

New ideas and many improvements in the mechanical features of the apparatus are claimed, having been brought about by years of careful study and exhaustive experiments.

The men who make the long-distance telephones are not enthusiastic inventors nor theorists with some eccentric notion in their heads which they believe will revolutionize the telephone world. Neither are they men who took up the telephone manufacturing business because they saw vast increased demands for telephones and thought to jump into a growing industry. Rather, they are trained electrical engineers who have been acquainted with the telephone art and electrical designing since the telephone first became a definite feature throughout the country; men who have been thinking of telephones and telephone improvements for many years, and selling them as fast as they invented and made them. The new long-distance telephone is simply the fruit of the experience of such men. It is claimed it contains all the well-tested features and principles which experience has proven necessary to the telephones of the present and future for all classes of work, especially for the long-distance transmission of speech and sound.

The name of the company clearly defines the object for which the company has been formed. Its first object, above everything else, is to manufacture a high-grade line of telephone apparatus, especially designed for long-distance service. The company appreciates the fact that there are a number of manufacturers of first-class, staple telephone equipment—that the high Independent telephone standard of to-day has been brought about by the ceaseless efforts of many brilliant minds and the unrestricted generosity of capitalists, and this company would be the last to say anything that would be derogatory to the efforts and achievements of the many telephone companies of to-day. But it desires to state that its line of telephone apparatus throughout embodies the very latest ideas and improvements in the telephonic art of to-day, and it feels that there is a demand for telephones designed for strictly long-distance service. The Long Distance Telephone Sales Company owns valuable patents on improvements in the transmission of speech and signals. These inventions will be embodied and offered in the shape of the very best mechanical designs. It is said no substitution of inferior materials will be permitted anywhere in its entire line.

The company is officered as follows: C. K. Seibert, president and treasurer; M. L. Seibert, vice-president; S. A. Duvall, secretary and superintendent.

C. K. Seibert was formerly of Elkhart, Indiana, and has been engaged in different executive capacities with large manufacturing concerns. He is also a trained mechanical engineer. As Mr. Seibert's title indicates, he represents the financial part of the business, and it is stated he has at his command ample capital, both he and his associates, to satisfactorily promote the sale of the product of the company.

M. L. Seibert, vice-president, while not participating actively, will be identified in an advisory capacity and in seeing that the company is properly financed.

S. A. Duvall will be in charge of the engineering department of the company, and also will be the superintendent of the factory. Mr. Duvall's experience has been very comprehensive, and has given him a thorough theoretical and practical training in the telephonic art. He brings to the new company many valuable inventions that have been developed by long years of study. His experience in the art of transmission of speech covers a period of some ten years, and a large amount of the telephone apparatus now manufactured has been brought about by his experience and inventive ability. His greatest successes have been along the lines of practical designing, and it is a source of great gratification both to his company and to himself that all of his designs in the past have proven to be not only built upon sound electrical principles, but popular with the trade at large.

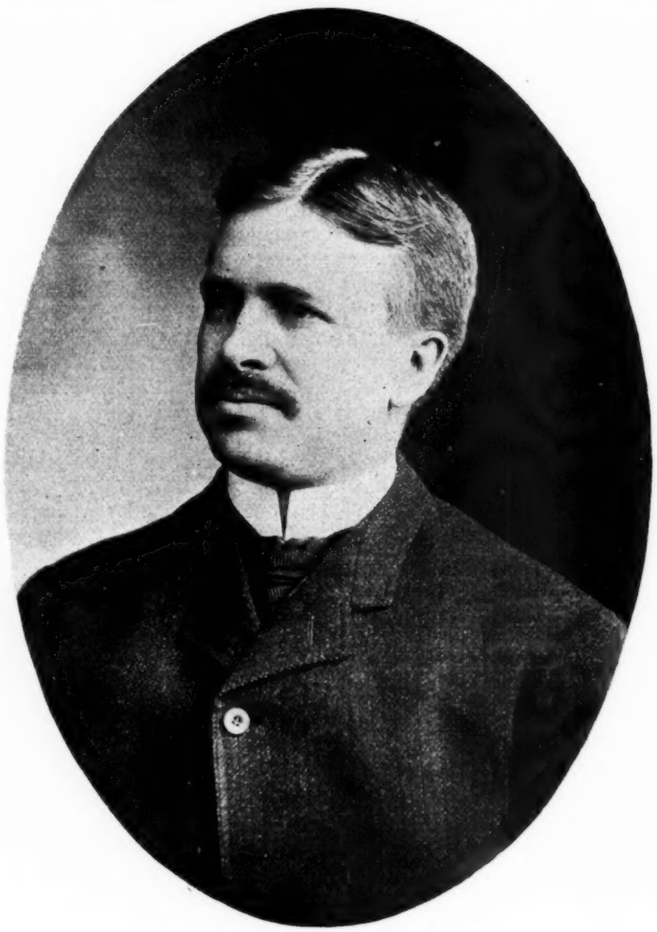
The main office and factory of the Long Distance Telephone Sales Company are located at the corner of Jackson boulevard and Canal street, Chicago, which is generally considered one of the logical centers of the Independent telephone industry.

H. M. FISK—HIS TELEPHONE INVENTIONS.

Two new devices recently brought out by the Fisk-Newhall Telephone Manufacturing Company, Chicago, have served to attract attention anew to the inventive genius of H. M. Fisk, senior partner of the concern. On another page of this issue will be found an illustrated description of the new Fi-Ne generator armature winder, and the new Fi-Ne motor coil winder, both of which Mr. Fisk designed and produced ready for the market, within the past month, and both of which, the company claims, are meeting with an unprecedented demand. Many companies are writing that it is "just what they have been looking for" and the majority of the orders say "ship by first express."

In addition to the two new devices above described, Mr. Fisk claims credit for the first compact type of telephone ever sold, one hundred of which were installed by him at Wheaton, Ill., in 1897. Mr. Fisk is said to have been the originator of the idea of measuring generators for voltage and amperage. He also designed and placed upon the market the very popular rheostat for adjusting the bells of bridging telephones, and designed a mechanical, self-restoring, tubular drop, fitting into a rigid iron frame, in a more neat and substantial manner than any type of drop or frame previously offered to the trade. The restoring feature of this drop is an especially simple and attractive one.

Another of Mr. Fisk's recent inventions is the Fi-Ne lock for compact telephones, which he originated and placed upon the market some three or four months ago. Perhaps



H. M. FISK.

the most important, however, of all Mr. Fisk's many useful inventions for the telephone industry, and the one which has figured most conspicuously in the history of the trade, is the well-known Fisk mechanical self-restoring drop, the first of its type, which he patented in April, 1894. This invention marked a new epoch in Independent telephone progress.

It will be noted that Mr. Fisk has brought out a great many and a very wide variety of practical telephone inventions. If "keeping everlastingly at it" brings success, Mr. Fisk is certainly entitled to his share of reward.

Henry M. Fisk was born at Indianapolis in 1864, and at the age of eighteen finished his high school course and entered a banking institution, where he spent ten years. In 1892 he entered the employ of the Chicago Telephone Company as installer of telephones, and as a jovial reminiscence of his early experiences with that company, says that he worked three days, and was sick ten, after which he re-

signed, but later re-engaged with them in the switchboard department. After three weeks of service in that department he resigned to take a position as inspector, and before another month had passed he was transferred to the engineering department, where he remained for two years. In April, 1894, he left the Chicago Telephone Company to go with the Western Telephone Construction Company, with which concern he remained until the latter part of October. During the subsequent year he engaged in the manufacture of switchboards, under the firm name of Forsyth & Fisk. Later on, Mr. Fisk was connected with the Chicago Telephone Supply Co., and devised the patent self-restoring drop then manufactured by that concern. He also originated the tubular glass fuse while with them. The Fisk-Newhall Telephone Manufacturing Company was launched by Mr. Fisk and his partner, S. F. Newhall, in 1902.

In addition to his being an expert in the manufacturing line and one of the foremost inventors of the telephone field, Mr. Fisk is also an acknowledged authority on construction work, and has built for his company two handsome exchanges at Watseka and at Cedarville, Illinois.

NEW MOON SPECIALTIES.

The Moon self-soldering pot head consists of a seamless brass tube, terminating in a Moon self-soldering nozzle, similar to the nozzle used with all Moon terminal heads and junction boxes. The cable is first passed up through the nozzle, and the pot head slipped back on the cable out of the way. After the splice is made, the pot

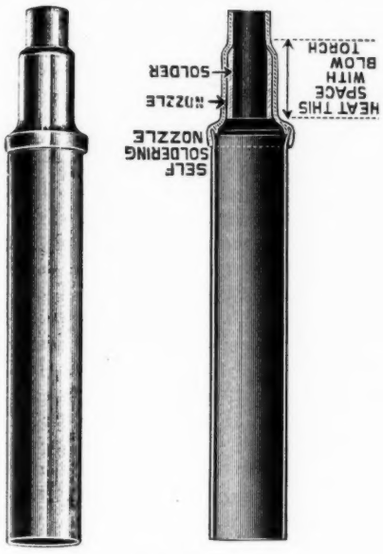


FIG. 1.

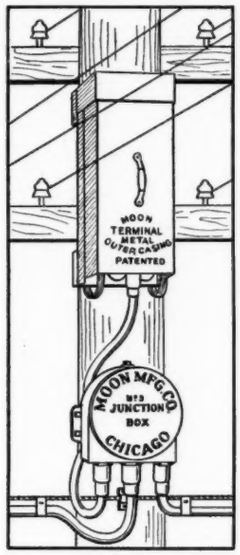


FIG. 2.

head is slipped forward to place, covering the splice, and the joint with the cable sheath is formed by simply heating the nozzle with a blow torch. The pot head is shown in Fig. 1.

The manner of tapping out wires from a Moon junction box is shown in Fig. 2, a nozzle opening being provided for that purpose. Tapping out may be easily done at any time, if an opening for an additional nozzle is previously provided. A short piece of cable extends from the nozzle of the junction box to the nozzle of a terminal head, which may be located on the same pole, or the terminal head may be located on an adjoining pole.

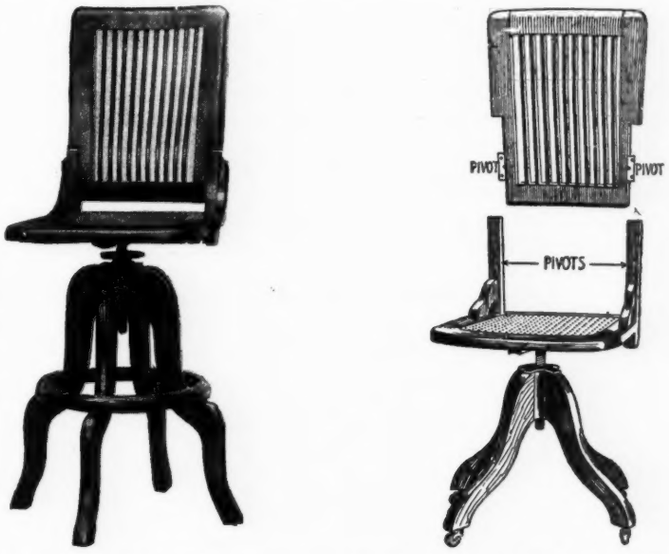
The cable may terminate or dead end in the junction box, but the box should be provided with one or more additional openings for nozzles of proper size.

NEW STYLE OPERATOR'S CHAIR.

The cheerful operator and the pleased subscriber—terms which are practically synonymous in telephone parlance—will accord a hearty welcome to a new style operator's chair, which is now being offered to the trade for the first time, by the Richards Chair-Panel Company, Woman's Temple Building, Chicago.

While the Richards Chair-Panel Company is one of Chicago's old, established and influential concerns, it was but recently that it decided to bring out this new operator's stool, combining many features which it has found most popular in other fields and adding new ones, peculiarly adapted to the operator's needs.

One of the strongest points of the Richards chair is its pivoted-panel back, a back which rests the operator where



RICHARDS "FIT-THE-BACK" TELEPHONE OPERATOR'S CHAIR.

she needs it most, and which entirely does away with one of the most objectionable features of telephone operation. This back (on which Mr. Richards holds exclusive patents) has recently sold his chairs, in competition with all the other best known makes, to such exacting corporations as the Pullman Car Company, Chicago & Alton Railway, Santa Fe Railway, McVicker's Theater, Chicago, and others.

The Richards "Fit-the-Back" chair panel is constructed on scientific principles and is attached to the frame of the chair by pivots near its lower end. It is controlled by pivot springs, which permit it to rotate and adjust itself to the back of the occupant, giving continuous support to the lower spine in each and every position which may be assumed. It works in an absolutely automatic, noiseless and imperceptible manner, and the comfort, ease and perfect rest attained thereby, it is claimed, can be obtained in no other chair nor with any similar device.

As every telephone operator knows, a chair must fit the back if it is to rest the back. When one's back is tired, as is almost invariably the case after a few hours on duty with the old-style operator's chairs, prompt and pleasant work becomes difficult and service inevitably deteriorates. Operators cannot do justice to their work if uncomfortable and nervous from backache. The back requires continuous support along its entire length, which the back of an ordinary rigid chair cannot give.

The Richards "Fit-the-Back" telephone operator's chair is entirely different from any other make of chair on the market. The foot rest is so extended as to not cramp the operator's knees; the height is adjustable—from twenty-

four to twenty-eight inches; the seat is of the best quality of cane, making by far the coolest and most comfortable seat which can be produced. All of the Richards chairs are hand-made, of the very best material, by skilled workmen, and are absolutely guaranteed to be as represented.

To those accustomed to the ordinary comfort of the average chair, the Richards chairs become revelations of luxurious ease, and once enjoyed will never be willingly relinquished.

To give responsible telephone companies an opportunity of testing these chairs, the Richards Chair-Panel Company offers to send, on five days' trial, any chair which may be selected from their catalogue, carefully packed and freight prepaid, upon receipt of the net catalogue price.

Should this chair fail in any degree to come up to expectations, the company gives buyers the privilege of returning the chair and binds itself to refund the full amount paid. An investigation of its reputation and high standing will convince anyone of its ability and willingness to do this.

In its catalogue, which will be sent upon request, will be found a few testimonials from those who have proved the comfort, luxury and ease of its chairs. Orders are shipped in the exact rotation in which they arrive, and prompt and courteous attention will be given all correspondence.

The advertisement of this company will be found on another page in this edition of TELEPHONY.

NEW EXPRESS DROP AND JACK.

The new express drop, with outwardly falling shutter, which has recently been brought out by the Vought-Berger Company of La Crosse, Wisconsin, is an example of inventive skill with engineering development.

In this drop all the requirements of a first-class express drop were evidently borne in mind during its development. The drops are mounted individually and are as compact as any on the market, occupying a space of only one by one and a quarter inches, including the mounting frame. The frame and springs are built up in a rigid manner, which insures absolute unchangeability in the adjustment. The restoring device, which operates by a coil spring, has so wide a margin that there is no possibility of its getting out of adjustment, either from rough handling or from wear.

Another important feature is the accessibility for repairs, and the fact that there is no change in the magnetic adjustment when repairs are made. The core is riveted to the shell and the coil is wound on a fiber tube, which slips loosely over the core, but which is held from turning by a pin in the end of the shell. All talking connections are soldered and it is well recognized that this is the only sure connection for talking circuits. The connections from the jack springs to the coil terminals are made by means of a swinging arm which is attached to the jack springs by a rivet and spring washer, and which catches the coil terminals in a spring clamp. This makes a perfectly sure connection for ringing the drop and also allows a disconnection of the coil terminals for the removing of the armature in much less time than any means devised heretofore.

The saddle which carries the armature is held to the shell or drop by strong bayonet catches, so that the armature may be removed by pulling straight back and can be replaced by slipping the prongs of the saddle into the bayonet catches. This allows remarkable speed in repairs and maintains an unchangeable magnetic circuit for the drop.

The small screws which are usually employed to hold the armature in its saddle and which cause so much trouble to inexperienced repair men, have been eliminated and replaced by a small pinion bearing which is unchangeable and has the least possible amount of friction. The face of the armature next the shell and core is covered with a German silver punching, so that it is impossible for the drop to freeze. The night bell contact is perfect, being a solid platinum to platinum contact under the weight of the drop shutter.

One of the most unique features of the drop is the two slides which operate the restoring mechanism. These slides normally cover the hole in the jack, thus giving an absolutely dust-proof jack. The importance of this will appeal to all repair men who have had to do with the inevitable cut-off jack, which is necessary for this class of service. Altogether, the drop appeals to one as mechanically perfect and would seem to have been designed to meet all the requirements of first-class magneto exchange service.

The Vought-Berger Company have some very interesting description matter on this new drop which they would be pleased to send in answer to any inquiries, also to send complete catalogue of its telephones and switchboards.

THE SUNSHINE INCANDESCENT LAMP.

The Sunbeam Incandescent Lamp Company of Chicago and New York, one of the most prominent of the manufacturers of incandescent lamps, announces to the telephone field the fact that it is making a specialty of telephone lamps for switchboard work.

24-Volt Sunbeam Telephone Lamp.

This company maintains a large and extensive miniature department, devoted exclusively to small types of lamps, and it looks for a large increase in the sale of telephone lamps. The company has obtained a license which permits it to use certain patented processes which are essential in the manufacture of lamps of the very highest quality and, as a result, its factory equipment is of the most modern and improved type. The greatest possible care is used in the selection of lamps which are to be shipped, and the various inspections to which each lamp is individually subjected could not be more rigid or exacting.

The Sunbeam telephone switchboard lamp can be supplied in any voltage required with either tipped or tipless bulb and the product will be found uniformly good in candle power and efficiency. The special filaments used are so shaped that the greatest possible amount of light is emitted from the tip end of the bulb, which is a most desirable feature. The bases are made in either wood or porcelain. It is believed that it will be found to the advantage of all who purchase telephone lamps to give the Sunbeam a trial, or at least to write for prices.

16 C. P. 110-Volt Standard Sunbeam Lamp.

This company manufactures also a complete line of standard incandescent lamps, a fact which is well known to all consumers. Address, The Sunbeam Incandescent Lamp Co., 242 S. Jefferson street, Chicago, or 57 Bethune street, New York City.

NEW SWEDISH BEAUTY.

The Swedish-American Telephone Company, Chicago, whose advertisement appears on page 50 of this issue, has developed a new type of compact magneto telephone. With the exception of the transmitter and arm, all parts are mounted on shelf or hinged door attached to it. (See advertisement.) All wires leading from the apparatus pass to four clips, which engage other clips on the back-board. The clips on the shelf are fastened to those on the back-board by means of machine screws. By taking

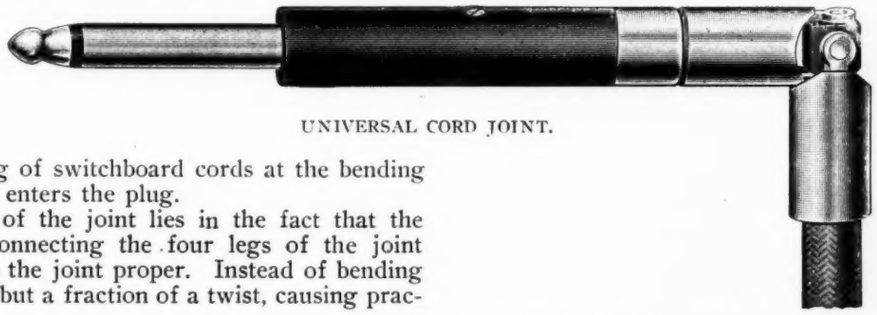
out four machine screws, all the apparatus may be slid out without interfering with the wiring. Thus all parts may be carefully inspected without unmounting. The induction coil can be removed by the simple unloosening of three machine screws. The one great feature is accessibility, as time means money in the average exchange. Anything which tends to facilitate the making of inspection or repairs, will be welcomed by the management of the plant.

It has been the aim of the Swedish-American Telephone Company to make all parts of this instrument very simple and durable, so that the repair man may quickly take care of any case of trouble without having to carry a heavy load of special tools. This instrument has been made so durable that it will practically take care of itself and except in case of accident the only attention that it requires is the replacing of the batteries, not oftener than once a year.

The Swedish-American Telephone Company has recently published a handsome 32-page catalogue, which illustrates in a thorough, up-to-date manner its product. Same will be mailed to any address on receipt of request.

UNIVERSAL CORD JOINT.

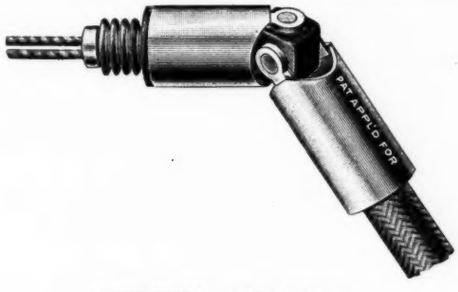
We show here an illustration of the Universal cord joint being manufactured and marketed by M. B. Austin & Co., Chicago. This little article is intended to do away with the wearing and breaking of switchboard cords at the bending point where the cord enters the plug.



UNIVERSAL CORD JOINT.

The chief novelty of the joint lies in the fact that the flexible connectors connecting the four legs of the joint lay at right angles to the joint proper. Instead of bending the flexible cord gets but a fraction of a twist, causing practically no wear.

The joint is entirely free from loose or friction contacts, all contacts being soldered. It is extremely flexible, enabling operators, it is claimed, to plug in much more rapidly than with the plain cord and plug. Another feature is that the prespiration from the operators hands comes on the solid shell of the joint instead of on the cord, preventing the rotting of the cord. Each joint comes complete, connected to a six-foot switch board cord of best quality and is ready to connect to plug. The cord itself always hangs in an absolutely straight line from the plug to the plug socket in plug itself. The joints will fit any plug of seven-sixteenths inch diameter or larger. Connectors are carried in stock to fit any plug having a five-sixteenths thread to screw cord into. This thread is used to connect the joint to the plug. Fittings for special types of plugs will be made to order at a nominal charge. The great saving in cords and trouble due to breakage in the old style cord and plug will soon pay the cost of joint besides eliminating the loss of operator's time due to changing or repairing the cords. The outer brass shells of the joint are insulated from the contact parts and carry no current whatever. In writing always specify the diameter of plugs used and also the maker of same.



UNIVERSAL CORD JOINT.

A NEW BOOK ON ECONOMICS.

Frederick S. Dickson, president of a number of successful telephone companies in Ohio, embracing the largest single system outside the Bell interests, has written a book on "Telephone Investments—And Others," which will be published about October 1st. This volume deals with the various forms of investment now offered to the public in America, and compares them one by one with the telephone. He considers government bonds, real estate, bank and trust company stocks, industrials, mines and public service corporations. The latter are divided into those supplying water, power, light, heat, transportation and communication, and the latter subject considers mail, telegraph, and telephone.

The author shows various forms of risk run when we lend our money or even deposit it in a bank. He tells us he has tried to make his subject clear to the least informed even at the risk of being tedious to the best informed.

Mr. Dickson's experience in the telephone field and on the directorate of various manufacturing and transportation companies in Philadelphia qualifies him to speak with authority on his chosen subject. He is not unknown, too, in the literary field and his out-of-door book "And the Wilderness Blossomed" was highly commended on its appearance a few years ago. He lately contributed the extensive bibliography to General Wilson's book on "Thackeray in the United States," so this last volume promises something of a literary as well as a business flavor. The volume is illustrated and with large type, good paper and bound in limp art linen, makes an attractive appearance. It is offered at the low price of 25 cents or by mail 30 cents to insure its wide circulation. Published at the Publication Department of The Cuyahoga Telephone Company, 150 Prospect street, Cleveland, Ohio.

TWO "STANDARD" TELEPHONE SPECIALTIES.

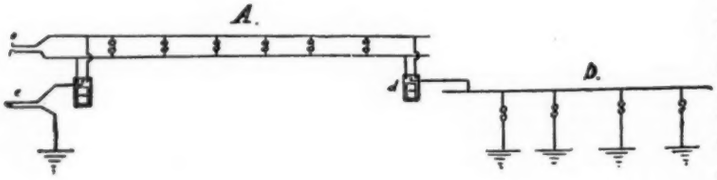
Two of the best-selling telephone specialties of the season are the Standard ringer or pole changer and the Standard duplex set, both of which are manufactured by the Current Electric Co., of 52 State street, Chicago.

The Standard Duplex set, which is made for bridging metallic lines and is designed to give two talking and ringing circuits from one metallic line without disturbance or cross-talk from the duplex circuit to the metallic line or vice versa when both are being used at the same time. It is simple, inexpensive, easy to connect to a line, has no movable parts or contacts to wear out or get out of order, is well protected by lightning arresters, and is guaranteed to give satisfaction.

There are a number of different ways in which telephone

men can materially improve their service and increase their revenue by using the Standard duplex set, and the Current Electric Company will be pleased to send all interested parties its descriptive matter and complete information.

One of the common uses to which the Standard duplex set is already being extensively put on rural and party lines



is shown in the illustration herewith. This shows the duplex set employed in connecting an extension or side bridging line with a metallic circuit. This connection renders the extension line service absolutely independent of the service on the metallic circuit. That is, if you have a metallic line running out from your exchange, say, ten miles, loaded to its capacity, and there are other parties beyond this line who would like telephone service, but you cannot afford to run a line all the way out from the central office to accommodate them, simply connect the duplex set to the outer end of the line, run a single wire to the new subscribers and operate the extension line the same as though the line ran all the way to the switchboard.

For various other equally good applications of the Standard duplex set inquire of its makers, who will be pleased to answer all inquiries promptly.

AN INTERIOR AUTOMATIC EXCHANGE TELEPHONE.

The Connecticut Telephone & Electric Company, of Meriden, Conn., has placed upon the market an intercommunicating telephone for interior service, with many valuable points of interest to every exchange man. This instru-

INTERIOR AUTOMATIC EXCHANGE TELEPHONE.

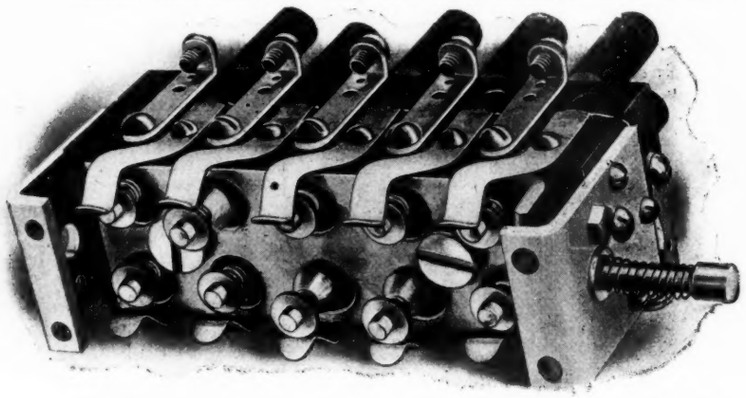
ment can be connected to the exchange, and the manufacturers claim is the only one made for this purpose which is absolutely non-interfering. One of the many features is its new non-interfering exchange trunk button, which is an exclusive "Connecticut" feature. This device is so arranged that it cuts the telephone off the interior system so that there is absolutely no chance for interference. With this telephone it is possible to call direct to any point in the system with the receiver on or off the hook. The switch mechanism is shown in the accompanying illustration. The buttons are automatically restored when the receiver is returned to the hook and the telephone is also cut off the line. It is also possible to call any number of departments together and hold a joint conversation. All connections, and all contacts are rubbing and positive. rubber, thereby making a perfect insulation for the line connections, and all contracts are rubbing and positive. The plate of this instrument does not enter into the talking circuit as in some other makes of automatic telephones. It is made of steel, thereby doing away with the wear and tear of the brass cone and brass plate. With this construction chances for poor mechanical construction are eliminated. This instrument, it is said, is being adopted by some of the largest exchanges. It is particularly adapted for common battery exchange service. The circuit arrangement is made for central location of the battery. The Connecticut Telephone & Electric Company has prepared a bulletin which it will send to anyone interested. It will also be pleased to ship systems on trial to responsible parties.

A LARGE CONTRACT.

The Stromberg-Carlson Telephone Manufacturing Company, Rochester, New York, reports having closed a contract with the Kinloch Telephone Company, St. Louis, Missouri, for a new central energy lamp line multiple switchboard of 17,000 lines capacity for its main exchange.

The contract calls for an "A" board consisting of thirty-seven sections, a "B" board consisting of ten sections, three monitor sections of two operators' positions each, one observation desk of four positions, one combination manager and assistant manager's desk, one combination chief and assistant chief operator's desk, one two-position wire chief's desk.

The main switchboard is to be equipped for the present with twelve thousand, five hundred (12,500) lines, thus making it the largest original installation ever made in the Independent field. The Stromberg company, as might naturally be expected, is very much pleased in having secured this contract because of its size. The company states, however, that they are even more pleased to think



SWITCH MECHANISM AUTOMATIC EXCHANGE TELEPHONE.

that they secured the contract against very strong competition, which might be expected, inasmuch as the above company already has a number of exchanges in operation, all of which are equipped with apparatus of another make.

One of their branch exchanges was installed just before the opening of the St. Louis exposition, and it is a well-known fact that the manufacturer gave an unusual amount of attention to this installation in order that it might be exhibited as a model central energy exchange to those visitors at the fair interested in telephone equipment.

The Kinloch Telephone Company has been well known in the Independent telephone field, as it was the first company

to install a large multiple switchboard, and on that account received considerable free advertising in the way of descriptions of its plant in all of the electrical papers. The type of board installed for the Kinloch was the four-division multiple switchboard invented by a well-known telephone man.

TWO NEW FI-NE TELEPHONE SPECIALTIES.

Illustrations are presented herewith of two interesting and practical new devices which have recently been introduced to the trade by the Fisk-Newhall Telephone Manufacturing Company of 241-249 South Jefferson street, Chicago, which are already meeting with such favor that a brief description of them will be of interest.

The Fi-Ne coil winder, shown in Fig. 1, is equipped with

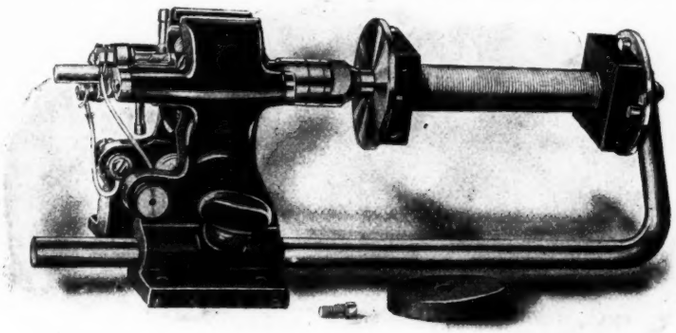


FIG. 1.

a motor which is easily operated by a battery of dry cells placed in series. This machine will take in all sizes of coils from the smallest drop coil to the largest induction coil. It is also equipped with a small emery wheel for sharpening drills or for various other uses which may be required of it by telephone exchanges.

In Fig. 2 is shown the new Fi-Ne generator armature winder. This device is provided with a clamp, whereby it

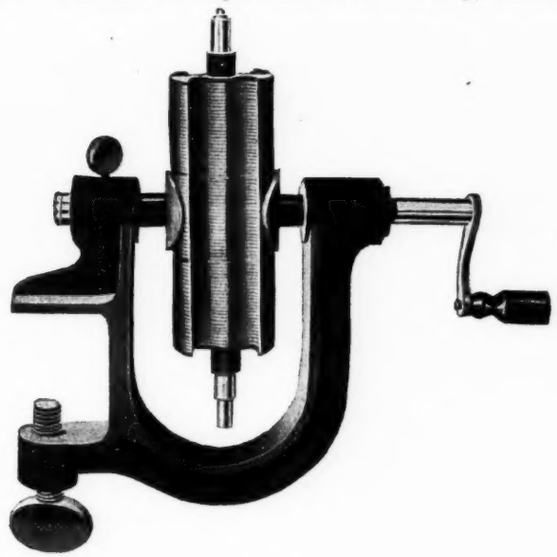


FIG. 2.

can be attached to any convenient bench, and readily removed after the winding operation has been completed.

As will be also noted from the illustration this device will accommodate any size of generator armature. It is predicted that these two ingenious little machines will prove invaluable to telephone men, as some means for rewinding coils and armatures at home has been sadly needed in the past. Almost every telephone company has had unhappy experiences at some time or other caused by coils burning out, or being short circuited. The delay entailed in sending the damaged apparatus to the nearest factory or repair shop is sure to cost quite a sum through loss of business and general inconvenience. It is claimed by the Fisk-Newhall Telephone Manufacturing Company that these two devices will in a short time pay for themselves in the saving of express charges alone, to say nothing of eliminating the annoyance and damage to business often occasioned by delays in getting coils back from repair shops.

FAHNESTOCK SPRING BINDING POST.

We illustrate a device known as the Fahnestock Spring Binding Post. This article is being manufactured and put upon the market by the Fahnestock Transmitter Company of 132 Havemeyer st. Brooklyn, N. Y.

In this post the wire is held by the action of a spring and we are informed by the above named company that in their standard size post, which will take any size wire up to and including No. 12 B. & S. the wire is gripped between two surfaces with a pressure of about eighteen pounds. They point out that with this steady pressure against the wire at all times there is no possibility of the wire shaking loose, or as in the screw and nut type of post, becoming loose because of the contraction and expansion of the screw and binding nut.

In addition it is claimed as an advantage that if the wire

FAHNESTOCK SPRING BINDING POST.

becomes slightly corroded the pressure against the wire will cut through the corrosion and maintain a metallic contact between wire and post. No tools are needed in order to make a good and permanent contact and that the wire does not have to be bent or twisted in any way. This eliminates the possibility of shirking the work necessary to make a good connection with the screw type of post.

The manufacturers report very large sales of this article, it having been adopted by the leading dry battery manufacturers who are putting out their cells so equipped at no increase in price. A sample will be sent by the manufacturers to any one interested.

GEORGE M. PAINTER LANDS BIG CUBAN CONTRACT.

The contract for a million feet of underground work at Havana, Cuba, has been let by the Havana Subway Company to Geo. M. Painter, the well-known contractor, Chamber of Commerce Building, Chicago. Mr. Painter has also secured the contract for the installation of a new telephone

system in Havana, for the Cuban Telephone & Telegraph Company, which holds the exclusive telephone concession for that city. The switchboard to be installed will have an initial capacity of 5,000 lines, with an ultimate capacity of 15,000 lines. The total contract secured by Mr. Painter aggregates $1,800,000.00. Mr. Painter has taken temporary offices at 111 Broadway, New York, where he is now very busily engaged in arranging for material and supplies for this contract. He expects to leave for Havana again by October 7.

NEW BISSELL TRADE MARK.

One of the most unique trademarks used in the telephone or electrical field by any of the manufacturers, or dealers is shown in the accompanying illustration. It will be used in all the advertising matter issued by the F. Bissell Company, Toledo, Ohio, as well as on all the company's manufactured product. The value of a trademark of this kind to a manufacturer is apparent, as every time it is seen on advertising matter or manufactured goods, it will bring the maker's name forcibly to mind. The trademark on the scarf pin makes an attractive piece of jewelry, and telephone men should write the F. Bissell Company for one, which will be promptly forwarded without cost. The company will gladly send one upon request and would be glad to send advertising matter and prices at the same time on its complete line of telephone and electrical supplies as well as on the specialties manufactured by the company.

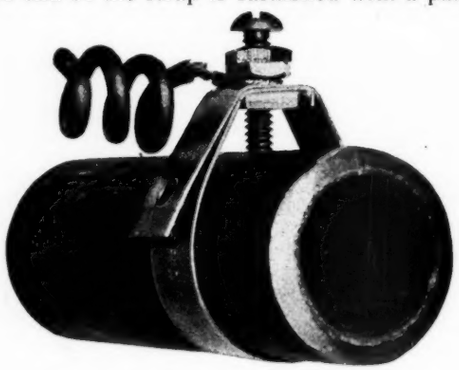
NEW CONNECTICUT VOLT AMMETER.

Whenever batteries of any description are employed it is absolutely necessary that some means is at hand to test their qualities. If even one of the cells is worn out the efficiency of the others are lost, and when these cells are used to supply current for telephone transmitters, the difficulty in making one's self heard is sometimes insurmountable. The Connecticut Telephone and Electric Company, of Meriden, Conn., has placed upon the market a new type of volt ammeter which is invaluable for this purpose and which is herewith illustrated. This instrument is especially designed for testing batteries and is coming into very general use. It is made up in two styles, one as a combination volt ammeter and the other reading in amperes only. The scales are graduated from 0 to 30 amps. and 0 to 6 volts, and are very carefully calibrated. The arrangement of the needle supports permits very delicate and accurate reading. This instrument can be used without the cord shown in Fig. 1 by holding it in the hand. This is an exclusive "Connecticut" feature. This instrument is guaranteed by the company to be accurate, durable and free from mechanical defects. The company will be pleased to furnish particulars to parties interested.

CONNECTICUT VOLT AMMETER.

BLACKBURN GROUND WIRE CLAMP.

The Blackburn ground wire clamp is designed to avoid difficulties usually encountered by the installer and to facilitate a rapid and successful ground connection. As shown in the accompanying illustration, the device consists of a brass strap, which can be easily bent to close around the desired pipe. The end of the strap is furnished with a pair of nuts through which a screw plays, whereby the strap may be drawn tightly against the pipe. As the screw is forced home it chafes the surface of the pipe in such a manner as to make a good electrical contact. The ground wire is attached by clamping it beneath the pair of nuts, which serve both as locking nuts and to attach the wire. Several holes are left in the brass strip so as to fit pipes of different diameter. Full particulars and prices will be furnished by the manufacturer, Geo. R. Blackburn, Cleveland, Ohio.



BLACKBURN GROUND WIRE CLAMP.

A WOOD PRESERVATIVE.

The subject of the preservation of poles by the application of good preservatives is one which merits the attention of all telephone companies. Among the many fluids recommended for this purpose is the Avenarius Carbolineum wood preservative, sold by the Carbolineum Wood Preserving Company of Milwaukee, Wis. This is a solution which, when applied to wood of any description under conditions of the most unfavorable character, will act as a powerful antiseptic and waterproofing element. The claim is made that it can save wood from the natural results of dampness, the attacks of insect and animal life and the ravages of fungoid growths. When utilized for the protection of seasoned wood the best results are obtainable.

This solution is ready for immediate use, and when applied simply calls for the employment of a brush and dipping vat. It is strongly recommended for the coating of fences, wooden buildings, sheds, shingles and beams.

When applied it forms a durable nut brown stain, which not only acts in the capacity of a paint and costs less, but prevents, through its protection against humidity, the tendency to warping. Excellent results are obtained by its application to brick or porus stone, or in any case where deterioration due to moisture is to be effectively checked.

The Carbolineum Wood Preserving Co. guarantees to refund money invested in Avenarius Carbolineum if same does not double the life of woodwork when properly applied.

Trade Notes

THE F. BISSELL COMPANY, Toledo, Ohio, has issued a catalogue which it states will enable a purchaser "to obtain quotations on the spot."

THE HEADQUARTERS of the National Lumber Company has been removed from Fort Worth, Texas, to its creosoting plant at Texarkana, Texas.

THE UNITED STATES PAY STATION COMPANY, Chicago, has issued a little booklet on the measured service problem, which is of considerable interest, and will be mailed free upon request.

THE NORTON ELECTRIC MANUFACTURING COMPANY has been incorporated at Camden, New Jersey. Capital stock, $100,000. Incorporators, Abner Smith, Frederick G. Norton, David L. Hart.

THE DEAN ELECTRIC COMPANY, Elyria, Ohio, has recently issued Folder No. 8, which treats of the company's No. 2 type common battery switchboards. It is illustrated and very interestingly written.

A NEW AND INTERESTING catalogue has just been issued by M. Klein & Sons, the well-known tool manufacturers of Chicago. Every lineman and user of tools is requested to send for this new publication.

THE TELEPHONE COMPANY, Warrensburg, Illinois, has been organized for the manufacture of electrical apparatus and supplies. George W. Claussen, Joseph A. Suerth and J. H. Rumsfeld are the incorporators.

WALTER H. HARDEN of Orland, Ohio, has applied for a patent on an automatic selective device for party line telephones. Several propositions have been made to Mr. Harden for the purchase of the inventions.

J. J. NATE was calling on Chicago friends, September 16, en route to Minneapolis from a visit to the home office and factory of his firm, the Stromberg-Carlson Telephone Manufacturing Company at Rochester, N. Y.

THE PORTER BATTERY COMPANY is arranging to remove from its present quarters at Canal and Jackson streets, Chicago, to Drexel and Fortieth streets, in the same city, where a new building is being erected for the company.

THE ADVANCE LUMBER COMPANY, Cleveland, Ohio, handles large quantities of chestnut poles, and is in a position to quote attractive prices on same to the telephone companies which are in the market for this class of goods.

THE WIRE AND TELEPHONE COMPANY OF AMERICA, recently incorporated, with main offices and plant at Rome, New York, has just purchased five acres from the Rome Factory Building Company and will erect a new building, 150x50 feet.

THE S. H. COUCH COMPANY, INC., 156 Pearl street, Boston, utilized a mailing card as an advertising novelty at its booth at the Electrical Contractors' Convention and Exhibition in Boston. The card, on the reverse side, was illustrated with two pictures of the firm's automatic intercommunicating telephones and drew attention to the fact that Boston is noted for three things, viz.: Beans, Brains and Couch Telephones.

THE BELDEN MANUFACTURING COMPANY, 194 Michigan street, Chicago, has recently installed a complete plant for the manufacture of all kinds of flexible telephone and electrical cords. Its capacity has been severely tested this summer, the plant being compelled to run day and night a great portion of the time.

W. H. CRUMB & COMPANY, telephone contractors and engineers of Chicago, have recently completed a long-distance telephone system for the United States Government at Belle Fourche, S. D., and are now employed upon a contract at Minidoka, Idaho. These systems are being constructed in connection with the governmnt irrigation schemes in the far West.

QUEEN & COMPANY, Philadelphia, Pa., manufacturers of scientific instruments, have recently issued an attractive folder, descriptive of the Queen Acme portable testing set and the company's many other specialties, which is effusively illustrated, and contains a great deal of valuable information in regard. It will be sent postpaid to anyone interested upon request.

THE NATIONAL BATTERY COMPANY, Buffalo, New York, through the medium of a descriptive catalogue, is calling attention to its line of storage batteries. These are made for many different services, including street railway, power and lighting plants, vehicles, motors, fire-alarm and telephone and telegraph. The company will be pleased to send its catalogue on application.

THE ELECTRIC GAS LIGHTING COMPANY, Boston, "Annunciator Specialists," is sending out a mailing card descriptive of its annunciaphone system, which is especially designed for use in small hotels. This system has practically every advantage of an expensive telephone switchboard, with the addition of an automatic fire-alarm system. Full particulars upon application.

THE WESTERN STEEL GATE COMPANY, Green Bay, Wisconsin, announces the removal of its plant to that city from Two Rivers, Wisconsin. It has increased its manufacturing capacity and now operates one of the best machine shops in northern Wisconsin. This firm manufactures the well-known Western post hole digger and is prepared to furnish this device in any desired quantity.

TELEPHONE MEN should write the National Wire Corporation of New York city for its circular on high grade wire for use in the construction of telephone lines. It contains the statement that "all of our telephone and telegraph wire is extra double galvanized with the purest and most expensive zinc that the world produces and is guaranteed to stand the Western Union test in every instance." A table of weights and resistances and other valuable information is also given.

THE EVANSVILLE BATTERY AND ELECTRIC COMPANY of Evansville, Ind., has been incorporated to manufacture storage batteries of the type covered by the patents of H. C. Porter of Chicago, well known in storage-battery circles as an inventor and engineer. Mr. Porter is vice-president and general manager of the new Evansville company, which has a paid-up capital of $100,000. He has been out of the business for a couple of years owing to poor health, but is now practically recovered and has organized the new company, which has a factory in operation and will soon be turning out cells for all purposes, particularly in large sizes. Mr. Porter is a believer in the operation of street railways by storage-battery cars, and says that he is pre-

pared to make a practical demonstration at his own expense for the benefit of any street railway man who is seriously interested.

THE CENTURY TELEPHONE CONSTRUCTION COMPANY of Buffalo take pleasure in announcing the opening of its new western office at 24 Ricksecker building, Kansas City, Mo., where it will always welcome queries of all natures, whether relative to problems met with in the operating field or as to the merits of Century apparatus, which is claimed by the company to be 100 per cent good. The company will make Kansas City shipments on all standard parts. This being a necessity in order to handle its rapidly growing trade in the West.

THE CHURCHILL CABINET COMPANY, 72-76 Churchill street, Chicago, although but about one year old, has already scored an unqualified success with the telephone trade. This company, headed by two popular and experienced men, has from the first made a specialty of furnishing high grade telephone cabinets, and is now running at full capacity, catering to several of the largest Independent concerns in the field. During the past month a lot of new machinery has been installed, so that, beginning with September 1, greatly increased capacity will be enjoyed and additional patronage can be accommodated. The company is especially well prepared to handle carload shipments to the trade.

THE WYCKOFF PIPE AND CREOSOTING COMPANY, INCORPORATED, Stamford, Conn., is furnishing the Bell Telephone Company, of Philadelphia, Pa., with millions of feet of Wyckoff creosoted wooden conduits in connection with the construction work of the Delaware & Atlantic Telephone and Telegraph Company on its underground trunk line system in and around Philadelphia, Wilmington, Princeton, Trenton and Atlantic City. This conduit and the creosoted plank used to protect it are being furnished from the Portsmouth (Va.) factory of the Wyckoff Pipe and Creosoting Company. The Bell Telephone Company has recently placed an additional order with the Wyckoff company for about ninety miles of creosoted conduit and the necessary plank to lay with it.

THE VIADUCT MANUFACTURING COMPANY, Baltimore, Md., is keeping abreast of the times and quietly improving its telephone system by introducing new designs and specialties, which will appear in these columns from time to time. A patent has just been issued to it for a pocket telephone. This little instrument, in leather case, must prove very acceptable to the many inspectors, linemen, firemen, etc., who have use for such an article. It is coming rapidly into general use. This company is the oldest manufacturer of district call boxes in the country, nearly every town is supplied with them, and its telephones are found from California to Maine, and in foreign countries. It was the first to make the telephone a success with the celebrated magneto bell, in 1878, and the first to make district messenger boxes away back in 1872.

THE BAIRD MANUFACTURING COMPANY, of Chicago, has secured the services as salesman of Mr. Chas. E. White to demonstrate the merits and operation of its Secret-Service telephone system to telephone companies. Mr. White is well qualified for this work, having been actively engaged in the telephone field since 1882. He has been manager of several Bell offices, and chief inspector of the Fire and Police Telegraph Department of St. Louis. Later he came to Chicago representing successively the Central Electric Company, of St. Louis, F. B. Cook, of Chicago and the Dean Electric Company of Elyria, Ohio.

Added to his qualifications as salesman Mr. White is very successful as an inventor, having to his credit the Rotary Self-soldering Heat Coil, the Pneumatic Heat Coil about to be placed on the market, also the new Half Tap and Test Connector now manufactured by the Harvard Electric Company.

THE HOOPESTON TELEPHONE COMPANY, Hoopeston, Illinois, is making a number of improvements to its local exchange among which is the installation of a new magneto type self-restoring drop switchboard with a trunking capacity for one thousand lines and equipped for the immediate operation of five hundred lines. The board is being manufactured by the International Telephone Manufacturing Company of Chicago, and in it will be combined all of the features of this company's latest apparatus. That the International company is enjoying a brisk trade in the magneto type switchboard department is evidenced by its report of the following recent sales: Morton, Williamsville, Orion, Hoopeston, Washburn, Stanford, Stonington, Henry, and Colchester, all in Illinois, and the following Missouri exchanges: La Plata, Clarksville, Eolia, Paris, Aux Vasse, Cyrene, Carrington, Ashley, and an addition to the equipment already installed at Bowling Green.

STROMBERG-CARLSON TELEPHONE MANUFACTURING COMPANY, Rochester, New York, reports having closed contracts for switchboards for the following places: Aurora, for use at Peoria, Ill.; Newark, Ohio; Cadiz, Ky.; Bartonville, Ky.; Donnybrook, N. D.; Sherman, Tex.; Litchfield, Mich.; Georgetown, Tex.; Paola, Kan.; Simpsonville, Ky.; Finchville, Ky.; Waddy, Ky.; Bagdad; Toledo, Ohio; Branchport, N. Y.; Philadelphia, for use at Scranton, Pa.; Lewiston, Idaho; Alpena, Mich.; Bristol, Tenn.; Des Moines, Iowa; Rochester, N. Y.; Walhalla, S. C.; Apalachicola, Fla.; Bristol, Fla.; Herman, Neb.; Marathon, Wis.; Rose Hill, N. Y.; Watson, Mo.; Tolo, Ore.; Niagara Falls South, Ont., Can.; Mt. Pleasant, Ill.; Hunter, N. D.; Union, Miss.; Harris, Pa.; Des Moines, Iowa; Roann, Ind.; Tower Hill, Ill.; Milacca, Princeton, Foley, North Branch, Rush City, Mora, Forest Lake, Grandy, Lindstrom, Braham, Minn.; Olathe, Kan.; Rochester, N. Y.; Truro, Iowa; Kalama, Wash.

THE DEAN ELECTRIC COMPANY of Elyria, Ohio, has just received an order from the United States Signal Corps for five hundred field telephones. These instruments are of the portable type, especially built for rough service and to stand extreme climatic conditions—heat, cold and moisture. The company, while only in the manufacturing field about one year, has made an enviable reputation by turning out carefully designed and thoroughly well-built apparatus. In this short time its business has increased to such an extent as to require increased manufacturing facilities, which has just been furnished by a large addition to its factory, giving over seventy-five per cent greater capacity. The company has also been awarded a contract by the Kinloch Long Distance Telephone Company of St. Louis, Mo., for equipping its three St. Louis sub-exchanges with the new Dean party-line system. In all there are eighty-three operators' positions to be equipped with this new apparatus. This equipment includes new plug shelves, iron frame key shelves, new four-party line indicating ringing keys, new supervisory lamp jacks and caps, and new order wire keys with associated visible busy signals. Duplicate sets of ringing machines for furnishing four frequency ringing currents, with busy back, don't answer and howler attachments are also to be furnished for each exchange. It will be remembered that the new Dean party-line system rings four parties bridged across a metallic line circuit selectively without any ground connections and without special telephone equipment excepting a new type of ringer. The simplicity and reliability of this new Dean system has already been the means if its adoption in over twenty-three exchanges.

Telephone Doings of the Hoosiers

LOUIS HOLLWEG, the new president of the New Long-Distance Telephone Company of Indianapolis and of the Indianapolis Telephone Company, who was chosen to fill the vacancy so tragically created by the death of Simon B. Sheerin, is now giving his entire time to the telephone business. He was formerly vice-president of the Indianapolis Telephone Company. Mr. Hollweg is the head of the great importing and wholesale queensware house of Hollweg & Reese. He is giving the business the same thorough attention that has contributed to his success in other lines. Mr. Hollweg has been prominently identified with the business life of Indianapolis and of Indiana for many years. He acceded to the unanimous wish of the directors of the local and long-distance telephone companies of Indianapolis to become the active president of each and to give his time and attention to the telephone business. This will be recognized at once as a great advantage in the direction of the affairs of the two companies. Mr. Hollweg is a man of pleasing personality, as well as of marked business ability.

H. B. Sale, the new vice-president of the Indianapolis Telephone Company and general manager of that company and of the New Long-Distance Telephone Company, has given his entire attention to the two companies during the six years of their existence. Having had considerable experience in practical telephone management he was elected secretary of the two companies on their organization, and later secretary and treasurer. He is familiar with the entire business of the two companies, as well as with the telephone situation all over the state, and has been prominently identified with the work of the national association. He is a man of active mind, great energy and fine business ability and is recognized as one of the best posted men on telephone affairs in the entire country.

The two companies and the Independent companies throughout the Hoosier state, now organized into a strong and effective state association, are working in harmony. The Independent telephone people of Indiana say that business conditions were never so prosperous for their several companies as now.

* * *

According to the plan of organization adopted by the Indiana Independent Telephone Association at Winona, July 12, wherein the state divided into districts for telephone purposes, some of these districts are now holding conventions. The tenth district convention was held at New Albany, September 18 and 19. The ninth district met at Princeton, Wednesday, September 20. The times and places for the other districts will soon be announced by the president of each district. Nearly all the Independent telephone companies have joined the state association by sending their signatures to the constitution and by-laws to C. S. Norton, secretary of the Indiana Independent Telephone Association at Indianapolis. The deflection of two Independent companies to the Bell in the early summer has had the effect of making firmer the alliance of the Independent companies. The two companies which sold a controlling interest to the Bell have continued their long-distance connections with the Independents. They were keenly alive to the fact that a business revolt would have resulted in their territory had the nearly 200,000 Independent telephones of the state been cut off from those towns. Meanwhile closer traffic arrangements for long-distance business are being made between the New Long Distance Telephone Company and those of all other states in the Mississippi valley and eastward to and including New York, Pennsylvania, Maryland, etc. A meeting was held by the general managers of these great Independent systems in Rochester, New York, a few days ago to devise methods for the yet further improvements of inter-state long-distance business. This was spoken of by some of the papers as meeting for a merger, but it was not. The reports of the various companies showed that they were getting the major part of the business and that the Independent long-distance service was favorably regarded and well patronized. Officials of the New Long Distance Telephone Company say the business of this company is much greater than ever before. This company is strictly an Indiana company. Its capital was furnished by Indiana people and is officered and managed by Indiana people, and it has kept in close touch with the business interests of the state. The Independent telephone companies of the state are enjoying a career of prosperity very generally and are confident that this will continue and increase. For increase in telephones and tractions Indiana leads the world.

* * *

Mr. C. S. Norton, secretary of the Indiana Independent Telephone Association, and Jesse W. Wick, one of the directors in the New Long Distance Telephone Company, returned recently from an attendance at the Southern Indiana Telephone Association convention at New Albany. They say that the reports which we had from all parts of that section of the state showed a gratifying growth of Independent telephone interest. Nearly all the important Independent telephone companies were represented in the meeting. Geo. W. Beers of Fort Wayne, president of the association, was among those present. An interesting program was rendered at the Mennerchor Hall and a Dutch lunch and smoker was then given in the banquet room over the hall. Plates were laid for about fifty. Chas. D. Knoefel, president of the association, acted as toastmaster. Responses were made by Colonel J. C. Powers and J. C. Daugherty and W. B. Fisher of Louisville and C. S. Norton of Indianapolis and President Beers. The Southern Indiana Association was merged into the Indiana Independent Telephone Association. This is the last of the former partial state organization to be merged into the state organization. Mr. Norton also inspected the Du Bois county telephone system at Jasper. Mr. Norton states that $100,000 is invested in the Du Bois county telephone system, which is well equipped and very efficient.

* * *

A pamphlet describing the plan of organization of the Indiana Independent Telephone Association together with the operating rules adopted and facts and figures on the Independent telephone companies of Indiana has just been issued by the association. It shows among other things that there are 368 Independent companies in the state, 15,000 resident stockholders, 175,000 subscribers, 30,000 miles of toll lines, 1,560 toll offices, $15,000,000 of capital invested in equipment and in bonds, etc., that the gross earnings last year were $3,500,000. The objects of the close organization now being formed are described to be improvement of service, harmonizing of interests, standardizing of equipment, unification of operating methods, decreasing the general expenses, increasing the value of securities and assured continued success. The state association has provided also for a uniform system of accounting. The Independents

say they have had a tremendous growth in business all over the state during the last year and claim to have between five and six times as many subscribers as the organization.

* * *

The Indiana state tax board has made public its preliminary assessment of telephone property in the state. The report indicates that the board yields to the plea of some of the larger companies for a reduction. Among the 350 telephone companies doing business in Indiana, perhaps the most noticeable decrease was made in the return of the Central Union Telephone Company's assessment from $54 to $40 a mile, making a total decrease in value of that company of almost $813,000. Another large decrease was made in the case of the Indianapolis Telephone Company; listed last year as the New Telephone Company, at $160 a mile, this year is dropped to $100 a mile. The assessment for the New Long-Distance Telephone Company was increased from $30 to $40 a mile, while the American Telephone Company, carrying the long-distance business of the Central Union, remains the same, $40 a mile.

* * *

The United Telephone Company, Bluffton, was increased from $70 to $110 a mile; Deleware & Madison County, Muncie and Anderson, from $105 to $135 a mile; South Bend Telephone Company, from $90 to $100 a mile; Logansport Home Telephone Company, from $30 to $35 a mile, while many other companies remain the same as last year. The assessment of the Cumberland Telephone Company, doing business in southern Indiana, was decreased from $60 to $50 a mile. The mileage during the year has been greatly increased and many plants rebuilt with better material and equipments.

* * *

At Cold Springs, Dearborn county, Indiana, a few days ago, Marcellus Bailey suddenly became insane and attempted to kill his mother. She only rescued herself by promptly using the telephone to call help. Walter Messersmith, near Muncie, was saved a few days ago, from bleeding to death by the promptness with which a doctor was called by telephone. A farmer in Kansas was saved from a coming cyclone by being warned over the telephone. An Indiana doctor saved his valuables from a burglar recently by being called out of bed by the telephone. Instances are experienced every day of farmers who get better prices for their products by inquiring market prices over the telephone. It is a poor telephone that will not repay doubly its cost every month, in the saving of time and worry and in increase of business.

* * *

A press dispatch from Noblesville announces that the Central Union Telephone Company has entered Hamilton county and will engage in active competition with the Independent company by offering a free telephone service to all desiring it, says the Ft. Wayne News. If the people of Hamilton county are wise they will not be deceived by the cheap tinsel of this specious allurement. It is merely the sugar used to bait the fly trap. Free telephones now mean exorbitant telephones when Independent competition has been laid low. The Central Union Telephone Company has never as yet acquired any particular reputation for philanthropy and any time it offers something for nothing is the time when the big woods are man's safest retreat.

* * *

Some people even yet do not realize that they can talk outside of Indiana over Independent telephone lines. This idea doubtless results from the Independents having been kept out of Chicago and Cincinnati by peculiar local conditions, though they expect to be in both cities ere long. Connections can be made with nearly all other points in adjoining states. Though the New Long-Distance Telephone Company is strictly an Indiana company, it has traffic and contract relations with other Independent long-distance companies in all adjoining states. Information regarding such matters ean be obtained from any Independent exchange.

* * *

The city council of Frankfort has granted a franchise for twenty-five years to the New Long-Distance Telephone Company. The Central Energy company of Frankfort recently sold a controlling interest to the Central Union. The franchise of the Central Energy company states the maximum rates which may be charged; that of the Bell in the same city does not. The action of the Frankfort council is taken to mean that the people are determined to keep the telephone service independent of any monopoly.

* * *

In several communities in Indiana, where competition is strong, the Bell Telephone Company continues to offer free service to all asking for it. The Bell company in this touching beneficence is pursuing the same tactics that are employed by the fellow who lavishes about 5 per cent worth of wheat on a quail trap in order to secure for his own eating about five dollars worth of fat birds.—Ft. Wayne News.

* * *

The Independent telephone company of Shelbyville prints in the columns of the Shelbyville papers each week a list of new subscribers and a list of those who have dropped out. Patrons have grown accustomed to clip these lists and correct their directories from them. With a little care and a little paste, the telephone directories are kept up-to-date. The company believes the money invested thus in advertising space is well applied.

* * *

Walter Messersmith, living near Muncie, accidentally cut an artery a few days ago. A physician was telephoned for and five minutes after receiving the telephone message, was speeding to the Messersmith home in the fastest automobile obtainable. The young man is recovering. The Messersmith family say the young man would have died from loss of blood had there not been a telephone in the house.

* * *

So much opposition developed at Hope, Indiana, to granting a franchise for a second telephone system to Lewis Blades, when it became rumored that the Central Union was back of him, that the application for a franchise was not presented. There is already an Independent system in Hope.

* * *

The Markle Telephone Company which was a part of the United property recently bought by the Bell people, has raised its rates and a similar increase is expected in other towns of the United.

* * *

Macy, Miami county, Indiana, has had a good working Independent telephone exchange for two years. Recently a so-called "mutual" telephone company asked for a franchise, refusing to name rates or state its officers. The franchise being refused it proceeded to put up its lines without it. The workmen were then arrested. A dispatch from Rochester, Indiana, says:

"In Macy it is said that the new company, known as the 'Mutual,' is backed by the Bell company, which tried to get subscribers to start a system one year ago, but was not successful. It has become pretty well understood that whenever a so-called 'mutual' company asks to compete with a well established Independent telephone company and refuses to submit to reasonable municipal regulations regarding rates, etc., that the Bell company is behind the deal somewhere. It is only recently that the Bell company evinced any love for the farmer. When it had a monopoly there were no farm telephones in Indiana. Connected with

the Independent system there are now about 30,000 farm telephones. To get franchises where they have otherwise failed, the Bell people recently have donned farmers' garb in several instances."

* * *

Among the improvements being made by the Independent telephone companies in Indiana may be mentioned the following: The Mutual Telephone Company of Shelbyville is rebuilding its entire plant; the Crawfordsville company is laying a vast amount of cable; at Columbus additional telephones are being installed at the rate of fifty telephones per month; $15,000 additional is being expended in rebuilding the plant at North Vernon and in improving the lines; the New Long-Distance Telephone Company has installed new circuits to Franklin, Greenwood and Veedersburg, and two new circuits from Indianapolis to Bedford; the Lafayette company is expending about $75,000 in improvements; at Kokomo nearly 300 new applications for telephones have been filed and the capacity of the plant will have to be enlarged to accommodate these. About $4,000,000 has been spent on improvements by the Independents of Indiana during the past year.

* * *

The appraisers appointed to place valuations on the personal estate left by the late Simon P. Sheerin have filed their report with the probate commissioners in Indianapolis, Indiana, showing an aggregate value of the estate of $298,877.41. The property consists of certificates of stock in the various telephone companies, principally local corporations. The inventory follows: Indianapolis Telephone Company, 1,196 shares, $59,800; preferred stock, same company, 299 shares, $22,425; New Telephone Company, 421 shares, $33,686; New Long-Distance Telephone Company, 1,111 shares, $49,995; Citizens' Telephone Company, Columbus, Indiana, 611 shares, $18,330; thirty-one bonds, New Telephone Company, $24,800; thirty-three bonds, New Long-Distance Telephone Company of Indianapolis, $28,050; fifty-nine bonds, Citizens' Company of Columbus, Indiana, $22,125. Cash in Fletcher National Bank, $8,410; cash in Capital National Bank, $4,915.

KINLOCH LONG-DISTANCE TELEPHONE COMPANY.

W. Roy McCanne, secretary and assistant general manager of the Kinloch Long-Distance Telephone Company of Missouri, with headquarters at St. Louis, has issued the following statement regarding that organization:

"The Kinloch Long-Distance Company was incorporated under the laws of the state of Missouri, June 9, 1900, and also has qualified to operate in Illinois, Indiana and Kansas. Work was started early in June, 1900, and its first plant, at Belleville, Illinois, was opened for business in November of that year. Since that time this company has made the remarkable record of earning and paying not less than four per cent dividends, and in 1904, five per cent dividends on all its stock, notwithstanding the fact that during the entire time a large portion of its plant was under construction.

"For the first two years its work was confined to building toll lines connecting together suburban cities and towns around St. Louis, including Alton, Belleville, Brooklyn, Collinsville, Edwardsville, Freeburg, Granite City, Madison, New Athens and Venice, Illinois, and St. Charles, Missouri, (in which places the Long-Distance company operates its own exchanges), and also to connecting up Independent systems owned by prominent people in O'Fallon, Lebanon, Marissa, and Troy, Illinois.

"In 1903 this company began extending on a large scale its toll line system, and to-day, through its own lines and those of its connecting companies, it reaches almost all the principal cities and towns in Kansas, Missouri, Central Illinois, Indiana, Kentucky and western Ohio. On the east its own lines extend to Terre Haute, Indiana, where direct connection is made with the lines of the New Long-Distance Telephone Company, covering the larger part of the state of Indiana, and through this latter company connection is had with western Ohio and Kentucky. On the north, its lines extend as far as Springfield, Illinois, and through its connecting companies to Moberly and Hannibal, Missouri. On the west, its lines extend as far as Sedalia, Missouri, where direct connection is made with the lines of the Kansas City Long-Distance Company, extending to Kansas City, St. Joseph, Atchison, Leavenworth, Topeka, and the principal cities and towns in Kansas and western Missouri. In the southwest, its lines extend as far as Joplin, Missouri, and Pittsburg, Girard, Columbus, and Cherokee, Kansas.

"The Long-Distance company handles the toll business of the Missouri lead belt and Kansas oil fields, not only to its own points, but into Kansas City as well. Connection is had with strong Independent exchanges throughout Illinois and Missouri, under long-term contracts varying from twenty-five to forty-nine years, strict in their service requirements, so that the excellence of the long-distance service is assured a permanency. From the toll lines of the company connection can be had in Missouri, with over 80,000 telephones; in Illinois, with over 30,000 telephones; in Kansas, with over 80,000 telephones; in Indiana, with over 167,000 telephones; in Kentucky, with over 35,000 telephones, making in the aggregate over 392,000 telephones.

"All of the Long-Distance company's property has been constructed under the personal management of Charles H. Ledlie, and the high class of the construction work has made its property famous, and its lines known wherever seen. Only the heaviest and best of construction material has been used. The property to-day is in the very best condition, and the class of service furnished over the Long-Distance company's toll lines is second to that of no other long-distance or local telephone company. On account of the character of the construction work, the maintenance on this property has been remarkably low up to the present time, and will continue as low as that of any other telephone company in existence. This company is possessed of favorable franchises and rights in all the cities and counties through which its lines are built and has perpetual rights to private rights-of-way on which many miles of its toll lines have been built.

"The Long-Distance company has recently installed a toll board in the Century building, St. Louis, which is the most up-to-date and complete of any similar apparatus in use. It owns and operates 2,100 telephone in its exchanges and toll stations, and has approximately 1,078 miles of pole line carrying 10,825 miles of copper wire, principally No. 8 and No. 10 B. & S. gauge. The principal part of its development has heretofore been in the state of Missouri, but many new lines are planned throughout the state of Illinois, and the extensive development in both states will continue during the next few years.

"In addition to the above, the Long-Distance company has recently acquired all the properties of the Kinloch Telephone Company, owning and operating a main and three branch exchanges in the cities of St. Louis, Missouri, and East St. Louis, Illinois. Two of the branch exchange buildings are owned complete by the company and are fireproof throughout. There is being constructed for the company a new modern fireproof building of six stories, the three upper floors of which will be occupied by the two companies, on the northwest corner of Tenth and Locust streets, St. Louis, and contracts have already been let for the most modern and complete switchboard equipment, requiring new subscribers' instruments in the main exchange district. When this exchange is completed it will have the largest switchboard and will be the largest individual ex-

change of any telephone company in the world. The present number of working lines to be installed is 12,500, with an ultimate capacity of 17,000 lines, providing facilities for more than 30,000 telephones. The local company operates 15,000 telephones in St. Louis and East St. Louis, has 200 duct miles of underground conduit, 360 miles of underground and aerial cable, 350 miles of pole lines and 4,500 miles of aerial copper wire. Only the highest class of construction work has entered into its property, and its plant is in first-class physical condition, excepting only its present main exchange switchboard and some of its subscribers' instruments used in connection therewith, which are to be replaced as above stated.

"For the past four years this company has earned and paid 4 per cent dividends annually to its stockholders. Following is the result of the operations of the combined properties for the calendar year 1904:

Gross revenue	$778,547.81
Operating expenses, maintenance, taxes, etc., including 5 per cent of the gross revenue paid to the city of St. Louis, and all other expenses, except interest	467,168.40
Net earnings, applicable to interest and dividends.	$311,379.41

"The revenue of both the local and long-distance companies is constantly increasing, and it is conservatively estimated that the combined properties will earn during the calendar year 1905, at least the sum of $350,000."

SWEDEN AHEAD IN TELEPHONES.

"America is wonderfully progressive in the development and adoption of all sorts of mechanical devices and modern methods, and takes the lead in most things, but when it comes to telephones, Sweden sets the pace for progressive America and the entire world," is the statement made by Orvar Gerle, the Alaskan mineowner, who has just returned from an eight months' tour of the old world, says the Minneapolis Journal.

"Swedish life in city, village and country is bound up in the telephone. All over the rural districts the telephone is met with, not only at the large estates, but on the very smallest farms. Every household in the cities has a telephone, every room in the hotels, even those of the cheaper class, and every table in the dining rooms. On the city streets there are telephone booths as thick as mail-boxes in American cities, and at these booths instant communication is obtainable with any part of the country. It is impossible to explain how thoroughly the telephone has become a fixture in the daily life of the Swede, and a stranger could hardly understand it without a personal visit.

"The result of this devotion to the telephone has been an evolution of a system so perfect that it leads the world, and the adoption of a series of telephone devices which, for simplicity, strength, beauty and general utility, are unexcelled. The land of the telephone would not be an inappropriate name for Sweden in the present generation.

"I am taking with me to Alaska several devices which will be used at the mines on Prince of Wales island. I have never seen their equal for practical purposes, handsome appearance, and, above all, for cheapness. One device is a combination of telephone and microphone. It is unique in that it has no speaking tube for transmitting. The sound is transmitted to a hollow tube in the handle of the receiver, which is held to the ear in the ordinary way. The speaker talks freely into the air. The microphone is much more sensitive than the ordinary telephone transmitter, and the device in itself is entirely hygienic, as there is no danger of infection from mouthpieces. It is operated by batteries and is intended for business houses, factories, hotels, steamboats, etc.

"There is also in my outfit a field telephone and telegraph apparatus, which is so compact that the combined receiver and transmitter can be carried in one's coat pocket. I have been told that this telephone, which is converted into a telegraph by pressing a push button in place of a key, has been adopted by the Austrian and Belgian armies to the exclusion of other systems."

SUBMARINE TELEPHONE ON THE LUCANIA.

Captain J. B. Watt of the Lucania explained to a New York newspaper man the service which the submarine signal receiver installed on board his ship has rendered. The system is that of J. B. Millet of Boston.

"The principle," said Captain Watt, "depends upon the fact that air, as a transmitter of sound, is more or less variable, whereas in water there are no changes. The lightships between New York and Boston are furnished with the submarine bells, but the English lightships are not. On our way out I heard the striking of the bell on the Sandy Hook lightship, 1, 2, 3, 4, 5 strokes, then a pause, followed by one stroke, which indicated No. 51. I was then about three miles away. Then we picked up the Nantucket lightship in the same way.

"Coming in during the fog we listened to the Nantucket lightship's bell, striking 1, 2, 3, 4, 5, 6, and repeating, indicating No. 66. We were from three and a half to four miles away. We picked up Fire Island light vessel from two and a half to three miles away. Sandy Hook lightship we heard two miles away.

"Sound travels through the medium of the atmosphere at the rate of 1,100 feet a second, and through the water at 4,400 feet a second. The receiving apparatus is placed within the ship in No. 2 hold in the fore part on the edge of the bilge upon the flat side just before the ship begins to tumble home. It is within a sixteen-inch cubical box. There is one box on each side, the angle irons of the frames being used to fasten the boxes in and rubber gaskets to make them tight. The boxes are twenty feet below the surface of the water, and must be beneath the wave level. The ship, as a whole, offers an obstruction to the sound, but the sides of the ship act as conductors.

"By listening first at the starboard receiver and then at the other, or vice versa, the line of bearing of the sound can be established. The machine on the lightships and headlands is regulated to strike just so many strokes, corresponding to the number of the station. The receiving apparatus aboard ship has a megaphone, which is connected by electric wires with the receiver in the wheelhouse. I presume the receiver would detect other sounds in the water, and if silver were to be used in the composition of the bell I see no reason why it should not be heard for ten or twelve miles.

AN ELECTRICAL SHOW.

The announcement made by the Electrical Trades Exposition Company that an electrical show will be given in the Coliseum Building, Chicago, January 15 to 27, 1906, will be of interest to every man identified with the electrical industry. The success of the venture is assured from the fact the largest electrical concerns in the country are behind the plan to give an electrical exposition such as the world has never seen. Thos. R. Mercein is the general manager of the project, and has opened offices in the Monadnock Block, Chicago, where information can be obtained and reservation made for space. The officers of the Electrical Trades Exposition Company are: Samuel Insull, president; E. D. Ellicott, Charles E. Gregory, E. B. Overshiner, vice-presidents; John J. Abbott, treasurer; Stewart Spaulding, secretary; Thomas R. Mercein, general manager.

National-Interstate Telephone Association

Official Bulletin Number Three

OFFICE.

The Association has begun the preparation of maps showing the Independent telephone development throughout the country. These maps are being made up by states, and only data which we have satisfied ourselves is absolutely reliable is being used in their preparation. When completed they will be an accurate record of the existing Independent lines throughout the country, and will be constantly kept up to date, new lines being added as rapidly as completed and reported to us. While we have sufficient data on hand to go ahead with this work, it is not as extensive nor as specific as we desire. We therefore request that every Independent telephone company in the country send us a map of all toll lines which they operate, dividing their lines into two classes.

A: Copper lines of No. 10 gauge or heavier.
B: Copper lines of No. 12 or No. 14 gauge, and all iron lines.

Designate lines under classification "A" by very heavy lines on your map, and those under classification "B" by extremely light lines. Where lines of both classes are on the same lead, designate same by a heavy line as being under class "A."

We cannot impress too strongly upon the Independent companies the importance of giving this matter their prompt attention, so that the map maker we have engaged for this work will not be unemployed while on our pay roll through lack of data. Long distance companies especially are urged to furnish maps and data regarding their through lines and connections. Our maps when completed will be invaluable to the Independent interests all over the country.

INFORMATION WANTED.

Requests for information sent to the various state associations, regarding the telephone situation in the different states are not meeting with the ready response they should. State association officials who have been asked for such information, are urged to furnish same as soon as possible, and all companies are requested to aid their state officers in gathering this data.

SUPPLY DEPARTMENT—CATALOG.

Catalog of the various supplies which the association is handling has been printed and a copy is being sent to each Independent company on our mailing list. All Independent companies who have not received our catalog by September 28th are requested to write this office, when copy will be furnished upon application.

STANDARD OPERATING RULES AND REGULATIONS.
STANDARD FORMS OF ACCOUNTING.

The Association has had several requests during the past month for copies of the Standard Operating Rules and Regulations and Standard Forms of Accounting. We should like to hear from all who care for separate copies of either of these forms. If there is a sufficient demand, the Association will arrange to publish them in book form. We could furnish these at about 10c per copy.

Address all communications to The National-Interstate Telephone Association, 708 Electric Building, Cleveland, Ohio.

September 22, 1905.

Incorporations of the Month

CALIFORNIA.

ALHAMBRA—The Alhambra Home Telephone & Telegraph Company. Capital stock $50,000, of which $5,000 has been subscribed. Incorporators, P. T. Spencer, C. G. Miller and associates.

SAN FRANCISCO—Home Telephone Company of Alameda County. Capital stock, $3,000,000. Directors: William Thomas, Thomas S. Parkhurst, Jr., L. S. Ackerman, J. E. Schoenfeld, J. Robinson, William E. Gerstle, L. Webster.

SEBASTOPOL—Gold Ridge Improvement Company. Capital stock, $11,500. Purpose, to own and operate telephone and telegraph lines, telephone franchises; to conduct a general business in the handling of telephone supplies; to consolidate telephone companies, etc. Directors, T. J. Janes, C. M. Weeks, C. B. Oldfield, A. B. Swain, Sebastopol; R. F. Crawford, Santa Rosa; George Ivancovich.

FLORIDA.

KISSIMMEE—The Osceola Telephone Company. Capital stock, $2,500. The officers are as follows: President, G. A. Beach; vice-president, C. W. Ward; secretary and treasurer, P. A. Vans Agnew; directors, G. A. Beach, C. W. Ward, W. B. Makinson, A. E. Donegan, P. A. Vans Agnew.

ILLINOIS.

GLASFORD—The North Star Telephone Company. Incorporators, Andrew Northrup, M. R. Turner, C. W. Burch.

MILLEDGEVILLE—The Milledgeville Mutual Telephone Company. Capital stock, $10,000. Incorporators, T. H. Fleming, A. B. Puterbaugh and A. M. Fike.

KEWANEE—The Kewanee Long Distance Telephone and Telegraph Company. Capital stock, $100,000. Incorporators, William I. Hibbs, Frank M. Ashe, Archie C. Shoemaker.

INDIANA.

PAOLI—Lost River Telephone Company. Organized to operate in Orange County. Capital stock, $325; directors not chosen.

GREENFIELD—The Home Telephone Company. Capital stock, $100. Incorporators, A. E. Reevy, M. M. Coe, Emma E. Chappel.

IOWA.

KELLERTON—Kellerton Mutual Central Telephone Company.

SHERMAN—Sherman Telephone Company. Capital stock, $2,000. J. C. Emery and others incorporators.

LE MARS—The Le Mars Telephone Company. Capital stock, $100,000. Incorporators, A. C. Cooledge, I. S. Mahan.

DES MOINES—The Independent Telephone Clearing House. Capital stock, $10,000. C. C. Deering and others incorporators and directors.

BARNUM—The Barnum Telephone Company has been incorporated at this place with a capital stock of $10,000. The incorporators are P. T. Burke and others.

CLINTON—Clinton County Telephone Company. Capital stock, $15,000. President and treasurer, Clark C. Davis; vice-president, Frank Means; secretary, C. W. Means.

CINCINNATI—The Farmers' and Merchants' Mutual Telephone Company has been incorporated at this place with a capital stock of $10,000. The incorporators of the company are G. W. McKeehan and others.

NUMA—Numa Mutual Telephone Company. Capital stock, $1,500. President, J. B. Packard; vice-president, W. L. Hurt; secretary, J. B. Rick. Directors, J. H. Harris, G. T. McCannon, J. W. Stewart, W. O. Doggett, J. H. Packard, R. B. Peak and H. W. Fox.

KANSAS.

MARVIN—Marvin & Kerwin Telephone Company. Capital stock, $1,000.

LARNED—The Pleasant Valley Telephone Company. Capital stock, $2,000.

WHITING—The Farmers' Mutual Telephone Company has been incorporated with a capital stock of $9,600.

KENTUCKY.

BLANDVILLE—Blandville Telephone Company. Capital stock, $320.

HOLLAND—Holland Home Telephone Company. Capital stock, $200.

DANVILLE—The Danville Home Telephone Company has been incorporated with a capital stock of $5,000.

FRANKFORT—The Goreing Telephone Company, of Hancock County, has filed articles of incorporation with the secretary of state. Capital stock, $600.

STUBBLEFIELD—The Citizens' Telephone Company. Capital stock, $500. Incorporators, H. A. Walston, H. I. Batts, D. A. Brown, G. M. Daniel, W. D. Puryear, A. A. Luther, J. E. Batts, J. B. Rhodes, J. P. Holmes, J. B. Jones.

MAINE.

NEWRY—Bethel & Newry Telephone and Telegraph Company. Capital stock, $5,000. President, T. H. Jewett, Bethel; treasurer, W. N. Powers, Newry; clerk, L. W. Ramsell, Newry.

MICHIGAN.

GRASS LAKE—Lake Rural Telephone Company. Capital stock, $400. The directors are John Killmer, Herbert Haney and Leonard Loveland. The other stockholders are John Miller, A. D. Main, Pearl Orbring, Henry Phelps, R. M. Hoppe. All are from Grass Lake.

MINNESOTA.

RUTHTON—Ruthton Telephone Company. Capital stock, $10,000. President, George Bingham; vice-president, Holger Peterson; secretary, N. C. Bertelsen; treasurer, S. B. Duea.

MISSOURI.

LAMAR—Lamar and Barton Telephone Company. Capital stock, $40,000. Incorporators, J. W. Layne, J. B. McGilvray, E. J. Layne and others.

NOVINGER—The Novinger Telephone Company. Incorporators, W. F. Niece, F. M. Gilliland, H. C. Truitt, Philip Weber, J. R. Kriner and others.

NEBRASKA.

BRIDGEPORT—The Wehn Telephone Company. Capital stock, $25,000. Incorporators, J. H. Wehn and associates.

HARTINGTON—Cedar County Farmers' Telephone Company. Capital stock, $5,000. Incorporators, A. H. Cressy, L. D. Greenwood and others.

ATKINSON—The Green Valley & Atkinson Independent Telephone Company. Capital stock, $2,000. Incorporators, Robert L. Hanks and Anton Prusa.

NORTH CAROLINA.

MCCORMICK—The McCormick Telephone Company. President and manager, M. L. B. Sturkey; treasurer, L. L. Randen.

ROSE HILL—The Rose Hill Telephone Company. Capital stock authorized, $50,000. Incorporators, James C. Williams, Gabriel H. Robinson, Maury Ward.

LEXINGTON—The Piedmont Telephone Company of Lexington, with $10,000 authorized and $300 paid in capital stock, has been chartered. Incorporators, Walter Finch, John Q. Finch, and P. D Finch, all of Lexington.

NEW JERSEY.

JERSEY CITY—The New Jersey Independent Telephone Company. Capital stock, $100,000. Incorporators, J. Herbert Lippincott, William V. Toffey, Cornelius A. Colc. Jersey City.

JERSEY CITY—United States Independent Telephone Company. Capital stock, $100,000, all common. Incorporators, Henry A. Bingham, Frank F. Tully, Robert S. Carmichael.

WEEHAWKEN, 522 Gregory Ave.—The Schmidt-Wilckes Electric Company. Capital stock, $100.000. Incorporators, Lambert Schmidt. Weehawken, N. J.; Felix Wilckes, 458 East 15th St., Brooklyn; Ferdinand Wilckes, 1211 Avenue G, Brooklyn.

NEW YORK.

CLARENCE—Pioneer Telephone Company. Capital stock. $10,000. Directors, C. D. Carmer, O. A. Martin, William Bald, E. Weinanger, H. C. Britting, F. C. Gould and F. W. Schaad.

PLAINVILLE—Plainville Telephone Company. Capital stock, $2,000. Directors, William B. Cox, Metta S. Wilson, Enos Smith, Er-

vin A. Cummins, Frank J. Smith, Charles F. Davis and Lisle J. Schenck.

KINGSTON—The following officers have been elected for the Citizens' Standard Telephone Company: President, Mortimer C. Drake; vice-president, Thomas M. Brush; secretary and treasurer, Charles Reynolds.

CAMDEN—The Camden Home Telephone Company. Capital stock, $25,000. Incorporators, Joseph F. Stockwell, Oswego; M. Stanley Powell, Clinton; Benjamin D. Stone, Arthur C. Woodruff, Albert T. Wilkinson, Harry L. Borland, Burton S. Osborn and Lyman P. Haviland, all of Camden; T. Harvey Ferris, Utica.

OHIO.

ELMIRA—The Northwestern Mutual Telephone Company. Capital stock, $10,000. Incorporators, J. H. Ferrell, J. F. Reeves, G. R. Shafer, Joel Wyse, Henry Keller.

OKLAHOMA.

TEDDA—The Caddo Telephone Company. Capital stock $5,000. Directors, George H. Studebaker, Ora P. Studebaker, Louis H. Fahrig.

QUAY—Quay Rural Telephone Company. Capital stock, $2,000. Stockholders, J. W. Shipley, O. F. Hutchinson, C. W. Crowant, R. M. Shultz.

MULHALL—The Oklahoma Farmers' Telephone Company. Capital stock, $10,000. Incorporators, H. M. Ferguson, E. P. Wilkerson, A. G. Childers and W. M. Hatfield.

WILLOW—The Willow Telephone Company. Capital stock, $1,000. Incorporators, L. C. Cousins, J. W. Berry, R. E. Dever, I. R. Warren, Dr. M. M. de Arman. President, J. G. Cousins

OKLAHOMA CITY—The Northwestern Rural Telephone Company. Capital stock, $10,000. Incorporators, G. G. Miller, D. A. Shriner, J. C. Young, W. N. Shellenberger, W. M. Clapper, all of Oklahoma City.

PENNSYLVANIA.

FRANKLIN—The Franklin Telephone & Telegraph Company. Capital stock $5,000.

ALBA—The Troy and Canton Telephone & Telegraph Company. Capital stock, $5,000.

CAMBRIA—The Luzerne & Columbia Telephone Company. President, H. M. Brittain; vice-president, B. H. Bowman; secretary, John W. Hughes; manager, A. T. Dymond.

RHEA SPRINGS—The Rhea Springs Telephone Company. Capital stock, $1,000. Incorporators, A. C. Ewing, John M. Ewing, S. S. Brady, J. E. Garrison, J. G. Crumbliss, Chapman Wasson, J. M. Clary.

MURRAYSVILLE—Murraysville Telephone Company. Capital stock, $5,000. Purpose, to operate a line from Wilkinsburg to Murrayville, thence to Greensburg. Directors, G. M. Greer, Charles Stunkard, Murraysville; J. C. Greer, Claridge.

HUNTINGDON—The Woodcock Valley Telephone Company has been chartered with a capital of $5,000. It is to build a line from Entrekin, Lincoln township, Huntingdon county, to Williamsburg, Porter township, Blair county. D. M. Summers of Entrekin is the treasurer.

SOUTH DAKOTA.

PLANKINTON—The Citizens' Co-operative Telephone Company. Capital stock $15,000.

EDGEMONT—Edgemont Telephone Company. Capital stock, $5,000. Incorporators, Arthur J. Colgan and John Waldron.

HUMBOLDT—The Humboldt-Hartman-Wellington Telephone Company has been incorporated in this city. Capital stock, $10,000.

CARPENTER—The Carpenter Telephone Company. Capital stock, $25,000. Incorporators, Samuel Birks, William G. Campbell, T. L. Wood.

CHAMBERLAIN—The Great Western Telephone Company. Capital stock, $25,000. Incorporators, Warren Young, David Henry, Frank B. Rowe.

CENTERVILLE—The Centerville Rural Telephone Company has been incorporated at this place. Capital stock, $25,000. Incorporators, W. E. Ege and others.

GARY—The Gary Telephone Company has been incorporated with a capital stock of $10,000. Incorporators, H. Bassett, J. H. Green, W. F. Gordon, and others.

TEXAS.

EL CAMPO—Coast Telephone Company. Capital stock, $500. Incorporators, T. J. Poole, C. W. Robinson, E. H. Koch, and F. J. Hardy.

TEDDY—Caddo Telephone Company. Capital stock, $5,000. Incorporators, George H. and O. P. Studebaker, Teddy; Louis H. Fuhering, Union City.

MONTELL—The Citizens' Telephone Company. Capital stock, $1,000. Incorporators, A. S. Baylor, T. S. Sutherland, James Whitecotton, L. V. Wallace, and Travis F. Jones.

SHERMAN—The North Texas Telephone Company. Capital stock, $10,000. Incorporators, R. J. McHugh, Fort Worth; S. W. Porter and S. D. Donoho of Sherman.

HUMBLE—Humble Telephone Company. Capital stock, $2,000. Incorporators, W. T. Campbell, A. M. Abbey, W. W. Woodworth. Purpose, construction of a telephone line from Houston to Humble.

TIMPSON—Timpson Telephone Company. Capital stock, $10,000. Incorporators, J. B. Bussey and others. Purpose, to build and operate a system of telephone lines and exchanges at Timpson and other towns in that section.

SHERMAN—North Texas Telephone Company. Capital stock, $10,000. Incorporators, B. J. McHugh, S. W. Porter, S. D. Donoho. Purpose, construction of a telephone line in Grayson, Cooke, Catlin, Fannin, Denton, and Hunt counties.

TEXARKANA—The Texarkana Telephone Company, with principal place of business at this place, has been chartered with a capital stock of $150,000. Directors, F. M. Marriott, Delaware, O.; W. P. Harrison, Fred E. Harrison, Cincinnati, O.; P. J. Eubanks, Columbus; B. H. Kuhl, Hiram Glass, J. Huckins, Jr., Texarkana, Ark. W. P. Harrison is president of the company.

UTAH.

PRICE—The Eastern Utah Telephone Company, with a capital stock of $60,000, has been organized here. R. G. Miller is at the head of the enterprise.

VIRGINIA.

CRAIGSVILLE—The Craigsville and Bell Valley Telephone Company. Capital stock, $5,000. The officers are as follows: President, J. B. Tuttle; vice-president, D. Kunkle; secretary and treasurer, L. E. Hicks.

RICHMOND—Winchester & Jordan Springs Telephone Company. Capital stock, $5,000. Incorporators, L. R. Fay, president, Frederick county; H. H. Baker, treasurer, Winchester; H. F. Byrd, secretary, Winchester.

VIRGINIA BEACH—Princess Anne and Virginia Beach Telephone Company. Capital stock, $5,000. Incorporators, J. Woodhouse, president; H. C. Woodhouse, treasurer; John S. Woodhouse, secretary, all of Norfolk.

WINCHESTER—The Appleridge Telephone Association has been incorporated with a capital stock of $2,500. The officers of the company are as follows: President, W. C. Graichen; secretary and treasurer, R. T. Barton.

HARTWOOD—The Hartwood and Fredericksburg Telephone Company. Capital stock, $4,000. The officers of the company are as follows: President, D. J. Shopoff; vice-president, C. J. Henry, Hemp; secretary and treasurer, P. W. Irwin, Falmount.

WASHINGTON.

TACOMA—As a result of the refusal of the Sunset Telephone Company to accept a franchise passed by the city council and put up a guarantee of $5,000, the application of E. Elbebster of Seattle for a franchise in Tacoma will be granted.

BELLINGHAM—Farmers' Mutual Telephone Company. Capital stock, $45,000. Principal place of business, Bellingham; lines to accommodate the rural districts. Trustees: P. D. Harkness, Everson; J. L. Balley, Nooksack; G. W. Herndon, August Nyman and Edward Brown, Custer; A. W. Frost, Lynden; L. G. Van Valkenberg, Sumas.

WISCONSIN.

ORCHARDS—Orchards Union Telephone Company.

BELOIT—Beloit Farm Telephone Company. Capital stock $5,000; in Illinois $500.

BELOIT—The Beloit Telephone Company. Capital stock, $20,000; in Illinois, $1,000.

BLAIR—Farmers' Telephone Company. Capital stock, $5,200. Incorporators, H. C. Shepard, A. P. Peterson, Guy Shepard.

GRATIOT—Lafayette Telephone Company. Capital stock, $25,000. Incorporators, H. W. Burmeister, C. Birkbeck and Ed Brannan.

FRANKSVILLE—Franksville Telephone Company. Capital stock, $2,000. Incorporators, G. J. Ellis, W. C. Holz, John Lawrence, Henry Tiechendorf, H. Crane.

BALDWIN—The Rush River-Eau Galle Telephone Company has been incorporated at this place. Capital stock, $3,500. Incorpora-

tors, Lewis Crogen, Edward Christensen, Andrew T. Sabbi, Thomas Nelson.

COCHRANE—The Farmers' Telephone Company. Incorporators, Fred Putz, Fred Hansen, R. C. Hener, E. C. Miller, Herman Putz, Albert R. Suhr, George Muehleisch, G. Klein, J. H. Herold, James B. Hope, John Staak, William Huth, A. R. Mohuk, W. M. Belitzen.

GREEN BAY—The Valley Telephone and Telegraph Company has filed an amendment changing its name to the Fox River Valley Telephone and Telegraph Company and increasing its capital from $250,000 to $350,000. W. E. Fairchild, president; Joseph P. Hoepfel, secretary.

ANNUAL MEETINGS.

ARKANSAS.

MAGNOLIA—The Magnolia Telephone Company. Capital stock $15,000, of which $3,000 is subscribed. The officers are as follows: President, R. L. Morse; vice-president, J. G. Brown; secretary and treasurer, Julius Kohn.

JONESBORO—The Automatic Home Telephone Company has elected the following officers: President, E. F. Young; vice-president, J. B. Mason; second vice-president, M. P. Welch; secretary, H. E. Schnee; treasurer, A. W. Hall. The above officers constitute the board of directors.

CALIFORNIA.

REDLANDS—The Redlands Home Telephone Company has elected the following officers: President, K. C. Wells; vice-president, J. J. Prendergast; secretary and treasurer, J. H. Breckenridge.

CANADA.

FREDERICKTON, N. B.—At the annual meeting of the New Brunswick Telephone Company the following officers were elected for the coming year: President, Hon. A. G. Blair; vice-president, J. L. Black; treasurer, Hon. F. P. Thompson; secretary, W. E. Smith.

SYDNEY, N. S.—The Eastern Telephone Company recently held its annual meeting at this place and elected directors as follows for the ensuing year: B. W. Chipman, C. F. Fraser, F. B. McCurdy, R. L. Borden, J. Y. Payzant, J. Mackintosh, of Halifax; Dr. Mackeen and H. Donkin of Glace Bay; B. Archibald, North Sidney; D. Finlayson, Arichat; James Macdonald, West Bay; Judge Dodd, W. Crowe, J. E. Burchell and A. C. Ross, of Sidney.

ILLINOIS.

SEWARD—A telephone company has been organized here with the following officers: William Neely, president; Herva Cleveland, vice-president; C. S. Thomas, secretary; Frank Hollenbeck, treasurer.

MILLEDGEVILLE—At a meeting of the Milledgeville Mutual Telephone Company, recently incorporated, the following officers were elected: President, A. B. Puterbaugh; vice-president and general manager, A. M. Fike; secretary, T. N. Fleming; directors, Derrick Fryer, Frank Turner, C. S. Thorpe, J. H. Ports, S. Hartwick and Chas. Zugschwerdt. Constitution and by-laws were adopted.

INDIANA.

SHERMAN—The Sherman Telephone Company has elected the following officers: President, J. A. Patterson; vice-president, E. L. Green; secretary, C. D. Stewart; treasurer, A. J. Sweet.

MOORELAND—The Mooreland Telephone Company has elected the following officers: President, W. R. Lines; vice-president, Jesse Luellen; treasurer, U. S. Moore; secretary, E. J. Davis.

COLUMBIA CITY—At the annual meeting of the Farmers' Mutual Telephone Company, held recently, the following officers were elected: President, Albert Bush; vice-president, W. H. Liggett; second vice-president, C. W. Alexander; secretary, C. R. Banks.

CRAIGVILLE—The German Telephone Company. Capital stock, $10,000. The officers are as follows: President, John Barger; vice-president, William J. Deihl; secretary, A. S. Abbott; directors, John Barger, William J. Deihl, A. S. Abbott, Walter Reed, D. C Huffman

SENECA—The stockholders of the Seneca Telephone Company recently held their annual meeting at this place and elected officers as follows for the ensuing year: President, R M. Emery; vice-president, Richard Johnson; manager and collector, John T. Campbell; secretary and treasurer, J. H. Gleason.

SEYMOUR—The stockholders of the Seymour Home Telephone Company recently elected the following officers: President, J. H. Andrews; vice-president, Lynn Faulkconer; secretary, J. C. Monteith; treasurer, W. F. Peter; directors, J. H. Andrews, Claude Seymour, Ed L. Barber, J. C. Monteith, Lynn Faulkconer.

DECATUR—At the annual meeting of the stockholders of the Citizens' Telephone Company officers were elected as follows for the ensuing year: President, Henry Hite; vice-president, John S. Bowers; secretary and manager, F. M. Schirmeyer; treasurer, E. X. Ehinger; directors, Frank M. Schirmeyer, Henry Hite, E. X. Ehinger, John S. Bowers, Dr. D. D. Clark.

ANGOLA—At a recent meeting of the directors and stockholders of the Steuben County Electric Telephone Company, the following officers wer elected: President, L. Taylor; vice-president, J. G. Yeagley; treasurer, E. A. Wilder; secretary, Harry E. Wilder; superintendent of construction, Louis R. Taylor. Old directors were re-elected. It was voted to increase the capital stock of the company from $50,000 to $100,000, to enable the company to make further extensions and improvements in its lines.

IOWA.

BRITT—The Hancock County Rural Telephone Company. President, E. L. Stilson; secretary, A. L. Severlin.

ATLANTIC—Grove Center Telephone Company. President, Preston Biglow; secretary, T. A. Berry; treasurer, Bert Prall.

BEAVER—At the annual meeting of the Beaver Telephone Company the following officers were re-elected for the ensuing year: President, H. C. Armstrong; secretary, W. C. Sundermeyer; treasurer, R. O. Beaver; trustees, Henry Beaver, Geo. A. Faber, John Folkerts.

DUBUQUE—The annual meeting of the stockholders of the Interstate Telephone Company was recently held in this city and officers elected as follows for the coming year: President, G. Harwood. Epworth; vice-president, R. W. Gadsden, Dyersville; treasurer, C. M. Laxson, Earlville; secretary, J. H. Dankhoff, Dyersville. Directors, J. M. Dunn, Earlville; J. J. Kann, Elkader; Vic Stevens. Dubuque.

KANSAS.

PARSONS—The Southeastern Telephone Association recently elected the following officers: President, C. H. Kimball, Parsons; vice-president, J. M. Dasbaugh, Cedarvale; secretary and treasurer. M. L. Robeson, Galena.

ALMA—The Waubaunsee County Telephone Company at its recent meeting elected the following officers for the coming year: President, O. J. Hess; vice-president, J. N. Dolley; secretary, A. S. Allendorph; treasurer, J. R. Henderson; manager, C. B. Henderson

MICHIGAN.

GLADWIN—The Gladwin County Telephone Company has elected the following officers: President, Fred Powell; secretary, H. L. Dow; treasurer, William Neely.

GRAND LEDGE—At the annual meeting of the Grand Ledge Telephone Company the following officers were elected: President. Clark Smith; vice-president and treasurer, D. Shadduck; secretary. G. M. Every; directors, Clark Smith, D. Shadduck, D. G. Kennedy. G. M. Every, Joseph Otto.

NORTHVILLE—The Northville Telephone Company recently held its annual meeting at this place and elected officers as follows: President, Dr. J. M. Burgess; vice-president, F. S. Neal; secretary, M. A. Porter; treasurer, R. C. Yerkes; directors, A. K. Carpenter, W. G. Yerkes, W. H. Yerkes, R. H. Porter; manager, M. A Porter.

READING—The stockholders of the Reading Mutual Telephone Company recently held their annual meeting and elected officers as follows: President, J. F. Fitzsimmons; vice-president, H. F. Doty; secretary and treasurer, G. E. Terpening; general manager, C. J. Fitzsimmons; directors, J. F. Fitzsimmons, C. G. Fitzsimmons, B. L Mallery, Clarence Kellogg, and H. F. Doty.

MINNESOTA.

WILLMAR—At the annual meeting of the Kandiyohi County Telephone Company, held in this city, the old board of directors was elected and the rates reduced from $18 to $12 per year. The officers of the company are as follows: President, J. O. Lundberg; vice-president, H. B. Eddy; secretary and manager, E. Hegstrom.

MISSOURI.

CLINTON—The stockholders of the Mutual United Telephone Company of Clinton have elected the following officers and directors for the coming year: President, W. F. Hall; vice-president, G. W. Schweer of Windsor; business manager, Dr. S. T Neill; secretary and treasurer, Geo. R. Lingle.

NEW JERSEY.

HAMMONTON—The Hammonton Telephone Company has elected the following officers: President, A. J. Rider; vice-president, M. L. Jackson; secretary, Frank L. Horne.

PATERSON—At the annual meeting of the stockholders of the Paterson, Passaic and Suburban Telephone Company the following officers were elected for the ensuing year: President, H. R. Swartz; first vice-president, George A. Post; second vice-president, W. S. Hancock; treasurer, Barker Gummere, Jr.; secretary, J. W. Lindsay; counsel, Wayne Dumont; superintendent, F. A. Demarest; directors, the above officers and H. H. Hamill, Walter Bamford, W. D. Blauvelt, E. C. Stokes, Richard Morrell.

NEW YORK.

BAINBRIDGE—At a meeting of the Bainbridge and Guilford Telephone Company the following officers were elected: President, Otto Ives; secretary, C. N. Smith; treasurer, Oscar Fletcher; directors, G. J. Spohn, Elvin Sherwood, S. A. Reynolds.

STITTVILLE—The Oneida County Rural Telephone Company has elected the following officers: President, E. W. Jones; vice-president, G. D. Thomas of Floyd; secretary, L. G. Willis of Holland Patent; treasurer, John E. Jones of Holland Patent; general manager, Ellis D. Jones of Stittville.

JAMESTOWN—The Home Telephone Company of Jamestown has elected the following officers: President, Jules Vautrot; vice-president, William Maddox; secretary, T. S. Lane; treasurer, C. W. Herrick. S. B. Burchard, George B. Devoe, R. C. Sheldon, B. D. Phillips, C. B. Selby, R. T. Izant and C. C. Clawson, with the officers, form the board of directors.

PENN YAN—At the annual meeting of the Crosby & Barrington Telephone Company the following officers were elected for the ensuing year: President, Charles E. Guile; vice-president, Howard S. Fullager; secretary and treasurer, Herbert C. Overshine; directors, Isaac Crosby, T. W. Windnagle, James K. Thayer, Howard Fullager, Herbert C. Overshine, Charles E. Guile.

DUNDEE—At the annual meeting of the directors of the Crosby and Barrington Telephone Company the following officers were elected for the ensuing year: President, Charles E. Guile; vice-president, Howard S. Fullager; secretary and treasurer, Herbert C. Ovenshire; directors, Isaac Crosby, T. W. Windnagle, James K. Thayer, Howard Fullager, Herbert C. Ovenshire, Charles E. Guile.

PENN YAN—At the annual meeting of the Dundee-Tyrone Telephone Company officers were elected as follows: President, Charles J. Watson; vice-president, Charles G. Howell; treasurer, Robert B. Sworts; secretary, Harry B. Harpending; manager, Samuel A. Price. Directors: Arthur Besemer, Charles J. Bigelow, R. S. Wall, Charles G. Howell, Eugene Vreeland, R. B. Sworts, S. A. Price and Harry B. Harpending.

NAPLES—The Ontario and Steuben Telephone Company has elected new officers as follows: President, William Waite, Atlanta; secretary, George A. Bolles, Naples; treasurer, W. H. Housel, Naples. These are ex-officio directors, and additional directors are D. D. Cottrell, North Cohocton; H. W. Blake, F. W. James and J. E. Lyons, Naples. A large amount of new stock has been taken and the lines will be extended in all directions.

DUNDEE—At the annual meeting of the Dundee Telephone & Telegraph Company recently held in this city the following officers were elected for the coming year: President, Charles J. Watson; vice-president, Clayton G. Howell; treasurer, Robert B. Swortz; secretary, Harry B. Harpending; manager, Silas A. Price; directors, Arthur Bessemer, Clayton J. Bigelow, Charles J. Watson, Robert S. Wall, Clayton G. Howell, Eugene Vreeland, Robert R. Swortz, Silas A. Price, Harry B. Harpending.

JAMESTOWN—The annual meeting of the stockholders of the Home Telephone Company was held recently in this city and the following officers elected for the coming year: President, Jules Vautrot, Jr.; vice-president, W. J. Maddox; treasurer, Charles W. Herrick; secretary, T. S. Lane; general manager, John H. Wright; directors, Ralph C. Sheldon, W. J. Maddox, S. B. Burchard, Jules Vautrot, Jr., Charles B. Selby, Charles W. Horrick, Brewer D. Phillips, T. S. Lane, George B. Devoe, Robert T. Ixant, Calvin C. Clawson.

TROY—At the annual meeting of the Commercial Union Telephone Company held at its office in this city recently the following officers were elected for the ensuing year: President, John T. Christie; first vice-president, James H. Caldwell; second vice-president, Edward Davis; secretary, W. Lewis Burk; treasurer, Peter McCarthy; assistant treasurer, William C. Colburn; directors, Arthur MacArthur, John T. Christie, W. Lewis Burk, William Connors, James H. Caldwell, Peter McCarthy, William C. Geer, William D. Mahony, and Cornelius V. Collins, Troy; Stephen C. Medbery, Ballston; Charles W. Cooly, Glens Falls; Edward Davis, Philadelphia; Edgar T. Brackett, Saratoga; Brodie G. Higley, Sandy Hill; William D. Barnard, Philadelphia.

OHIO.

BUCYRUS—The Bucyrus Telephone Company has elected the following officers: President, Dr. J. A. Chesney; vice-president, Benjamin Cherer; secretary-treasurer, J. C. F. Hull.

ODELL—The Odell & Sugartree Telephone Company at a recent meeting elected the following officers: President, James McMahan; vice-president, Howard Milligan; secretary, O. B. Lanning; treasurer, Perry Adams; directors: J. P. Lanning, George Adams, H. Milligan.

SPRINGFIELD—The Springfield-New Carlisle Telephone Company has organized with the following officers: President, C. D. Juvenal; vice-president, J. C. Williams; secretary and treasurer, W. W. Morris. Directors: Isaac F. Studebaker, W. W. Morris, J. C. Williams, S. A. Nuff, J. N. Cory, C. D. Juvenal, J. B. McGrew.

ZANESVILLE—The Odell & Sugartree Telephone Company has elected officers as follows: President, James McKahan; vice-president, Howard Milligan; secretary, O. B. Lanning; treasurer, Perry Adams. Directors: J. P. Lanning, George Adams and H. Milligan. The work of surveying and building of line was turned over to the board of directors.

OKLAHOMA.

HELENA—At the annual election of the stockholders of the Helena Mutual Telephone Company, held recently, the following officers were elected for the ensuing year: President, J. W. Hines; first vice-president, I. L. Magee; second vice-president, Joe McCully; treasurer, G. N. Kneeland; secretary, E. S. Wilhite.

SOUTH DAKOTA.

ABERDEEN—At the annual meeting of the stockholders of the Dakota Central Telephone Company, recently held in this place, the following directors were re-elected for the coming year: J. Y. Zeitlow, Isaac Lincoln, C. H. Herreld, J. F. Zeitlow, W. G. Bickelhaupt.

CANOVA—The Canova Telephone Company has elected the following officers for the ensuing year: President, G. H. Randall; vice-president, T. Wilson; treasurer, A. F. Clough; secretary, Charles McCaffree; general manager, H. A. Ramsdell. Two new rural lines will be constructed at once.

GROTON—The Groton-Ferney Mutual Telephone Company recently held its annual meeting at this place and the following officers were elected: President N. O. P. Synoground; secretary, M. F. Bowler; treasurer, Ferdinand Erdmann; directors, the above officers and Chas. Rossow, Charles Schlichtling, W. May, Ever Johnson.

TEXAS.

MCKINNEY—At the annual meeting of the stockholders of the McKinney Telephone Company officers were re-elected for the ensuing year as follows: President, S. O. Scott, McKinney; vice-president, J. E. Farnsworth, Dallas; secretary, F. E. Bedlow, Dallas; treasurer, Jesse Spain, McKinney; manager, Miss Pauline Hughes.

VIRGINIA.

FREDERICKSBURG—At the annual meeting of the Toluca and Fredericksburg Telephone Company the following officers were elected: Hugh Adie, president; C. A. Bryan, secretary; E. S. Moore, business manager. Directors: N. B. Musselman, R. A. Moncure, T. J. Waller, C. A. Bryan, M. K. Lowry and T. A. Groves.

WASHINGTON.

GOLDENDALE—At a meeting of the Klickitat County Farmers' Coöperative Telephone Company, held in this place, the following officers were elected: President, J. S. Eddings; vice-president, N. C. Metier; secretary, Fred H. Vunk; treasurer, A. M. Wiley.

WEST VIRGINIA.

MORGANTOWN—At a recent meeting of the stockholders of the People's Telephone Company the following officers were elected for the ensuing year: President and treasurer, Milton Hirschman; secretary, George C. Baker; directors, L. S. Brock, E. M. Grant, J. P. Fitch, Frank Cox, W. E. Glasscock, D. H. Courtney, I. C. White, and the above officers.

IN THE RURAL LINE DISTRICTS

When all the telephones in our village are installed, the village exchange will total a dozen or more.—*Prior Lake Pickups in Jordan (Minn.) Independent.*

Thousands of Poles are said to be on a strike. Wonder if this will delay the Hughes Telephone Company of Bismarck in extending its line into Linton?—*Linton (N. D.) Advocate.*

The 'phone between Henderson and Blakeley seems to be very busy lately. Absence makes the heart grow fonder.—*East Side Jottings in Henderson (Minn.) Independent.*

Willie Johns went to Webb this morning to complete the telephone system at that place. That Willie is a splendid workman is proven by the satisfaction his work always gives.—*Gillett Grove Items in Spencer (Iowa) Reporter.*

Henry Bethke and Joseph Lundberg are digging postholes for the rural telephone line. Together they dig about thirty-five holes per day, and twenty cents a hole makes a good day's wages.—*West Vernon Visions in Milbank (S. D.) Review.*

The Shaeffler-Fawcett Telephone Company have their system complete now, and it works better than Marconi's wireless telegraphy, for everybody has a receiver down and doesn't miss a word. —*Vesta Voices in Redwood (Minn.) Reveille.*

Polyphemus, et al., cut the G. and M. telephone line last week, thereby violating a contract, of their own asking, with Missouri folks. We may now expect business to be transacted "grammatically" at least.—*Ultima Thule Undulations in Lancaster (Mo.) Republican.*

Some miscreants have been tampering with the telephone wires east of here on the Rose Hill line, and the company have employed a detective to hunt them and the first thing the boys know they will lodge in jail and their parents will have to pay a fine or let the lads pay it in the county jail. Boys, they're after you!—*Rose Hill Reporter in Greenup (Ill.) Press.*

The wires are now strung on the telephone line and those who are in connection can call up central. Rural telephoning, however, is not what it seems to be as there is considerable listening along the line. What one knows everybody knows, consequently it is rather unwise for a young man to make a "date" with any other than his best girl.—*East Leroy Lisps in Marshall (Mich.) Statesman.*

A jollier crowd never went out to put up a telephone line than is out this week working on the new line. One common fault is they will smile at the ladies at the different houses, especially the cooks, and if it is nearing the hour when cooks are very essential,

of course Fye says that Jack is nearly used up while Jack declares Noah will not risk his life on another pole without either his dinner or having his life insured.—*Stockham Sparks in Aurora (Neb.) Republican.*

The farmers everywhere should get up on both hind feet and insist that the telephone poles, which now are found along almost all public highways stuck out about four feet from the fences, shall

be removed back on to the fence line. As now set it is impossible to mow the highways with any ease. We often wonder what lunatic started this plan of sticking them out into the road. They would be moved if on our farm mighty quick.—*Garfield (Ind.) Tribune.*

One of the telephone linemen has rented a cottage on the north side and is making garden. Report says he is soon to be married to a young lady living in the county. According to Dame Rumor one of the young lady telephone operators here is soon to be married.—*Tremont Twitters in Pekin (Ill.) Post-Tribune.*

Allegan folk complain of "rubberosis" on the telephone lines. There are many party lines in that neighborhood, and when one party is called up a dozen others listen and occasionally titter audibly. The formal complaint was made by a young man who frequently had occasion to converse with his best girl.—*Grand Rapids (Mich.) Press.*

The farmers of the valley held a telephone meeting in the city hall Saturday and decided to build a telephone line in the valley. Sixteen foot poles were decided on. They will soon be able to stay at home and fuss with their neighbor and no blows can pass. The women can visit and exchange recipes on a cold winter day.—*Anthony (Kan.) Bulletin.*

Ed Moles, Andrew Baker, Ota Sherman and some others are preparing to have a "Hello" machine in their homes. At the rate which telephone lines are being put up the time will soon come when they will form a network over the country and we will be like one great family united by the telephone.—*Long Grove Lisps in Maquoketa (Iowa) Record.*

The south end of the Central Mutual Telephone line was cut off from the "Hub" on Saturday, which caused some inconvenience. After some considerable search it was found that one of our handsome bachelors had grounded the wire by wrapping it around some barb wire and then forgetting it and plowing the barb wire under the soil for a few feet. We remember hearing him say once that he was afraid he would hear all the pianos, roosters and babies on the route, but we think he escaped these tortures last Saturday.—*Weatherford (Okla.) Democrat.*

The Home Telephone Co., was represented at the merchants' carnival by Miss Mable Howell, Marie Collins, Mr. O. J. Dorwin and Mr. J. T. Sykes. The scene was a family room consisting of father, mother and daughter. When the father leaves and mother and child were asleep, a burglar comes into the room. The mother and child were awakened and the first thought of mother was to call some one over the telephone. When the receiver was taken down the operator at the exchange heard the noise and sent one of the linemen to see to the trouble, also a policeman. The scene and costumes of the ladies were beautiful and the promptness of the telephone service to send help to those in trouble by simply taking off the receiver is one good reason for having a Home telephone.—*Jackson (Tenn.) Whig.*